The Builder.

VOL. XIV.—No. 720.

REGISTRAR-GENERAL'S Reports, pamphlets on improving the dwellings of the labouring classes, reports of the societies both in England and Scotland which have that same end in view, the Report of the Board of Health on the Metropolis Water Supply, a pamphlet by Dr. Snow on cholera and the water supply, with various other cognate publications, have recently accumulated before us and invite attention. Touching the dwellings of the poorer classes, little is to be added to the facts gathered and statements made in these pages and in "London Shadows" long ago. Major-General Tremenheere, in his little pamphlet,* follows precisely the same line of argument, and gives few facts that are not to be found in the latter work, although we must presume it has not fallen under his notice, as it is not alluded to in the list of publications on the subject given by the writer. This, however, is not to be wondered at when we find medical Officers of Health going over the same ground and urging the same views, as if for the first time, wholly unconscious, apparently, of previous labours, although these were widely made known at the time by the whole periodical press of the kingdom.

Major-General Tremenheere, after quoting some account of the condition of courts and alleys in the metropolis, such as we have again and again laid before our readers, says, "the time, it is believed, has now passed for the existence of such extreme cases." Do not let him believe any such thing. The condition of many parts of London is as bad as it ever was. Some parishes are more overcrowded than they have ever been; and the new streets now in contemplation will further increase the evil, unless provision be made in time. The major-general, however, is satisfied that the state of things is quite bad enough, and his main object is to point out that, notwithstanding disadvantages and mistakes, the improved lodgings provided by the Metropolitan Societies have produced a gross rental averaging nearly 10 per cent. on the cost of the buildings, "which [rental], if one-half be taken as the proportion of ordinary current expenses, would leave a very fair return upon the capital expended;" and then he goes on to urge that measures should be adopted to spread these unquestionable benefits, so that their progress may not be left to chance or to the fitful and irregular flow of private capital.

"If," says he, "the application of public money to the drainage of land be justifiable, much more so would it be to the cultivation of better domestic habits amongst the poor, to the saving of human life, by draining, cleansing, and ventilating the narrow spots where so many thousands of our labouring population actually dwell. To what better object could the assistance of the public funds, at a low rate of interest, be lent? Here are three organised societies.

1st. The Society for Improving the Condition of the Labouring Classes.

2ndly. The Metropolitan Association for Improving the Dwellings of the Industrious Classes.

3rdly. The Marylebone Association for Improving the Dwellings of the Industrious Classes.

All have succeeded in effecting to a certain extent an acknowledged good, have the advantage of some years' experience, both in failures and successes, and possess all the requisite establishments for extending their operations, yet are cramped in available funds. What reasonable objection can there be to Government advances being made at a low interest to these societies? As a general rule, such direct aid from the State is, of course, objectionable, but the case is entirely exceptional. Will the Government, or the public, be satisfied that, out of the whole population of London, about 100 families only, of the industrious classes, every year, shall have the benefit of improved dwellings? This is about the proportion in which they have been affected by this movement for twelve years past."

The writer urges that,—"The locality of the late cattle-market at Smithfield is admirably suited for lodging-houses on the new plan, and it would be very desirable that portions of it should be devoted to that purpose. The committee appointed to inquire into the proper appropriation of that site have recommended that it be preserved as an open space; but owing, they say, to the irregularity of its outline, there will be some difficulty in the adaptation of the whole as a place of recreation. A favourable opportunity, which so rarely occurs in the very centre of the metropolis, is thus presented for granting, on moderate terms, building sites for improved dwellings for the labouring classes, who abound in that neighbourhood. In the parish of Clerkenwell, close by, there were, by the last census, 64,705 persons, the great majority of whom were working people with families.

The permanent inhabitants of this part of London consist principally of the labouring classes; all others, whose means admit, having their homes and families in the suburbs. Taking Smithfield as a centre, there is, perhaps, no other part of the world, within so small a radius, where the demand for human labour is so great as there; and, in like manner, there is probably no other spot which stands so much in need of good dwellings for the poor, nor one in which model lodging-houses, on an extended scale, would be so certain of success."

In future erections, the barracks and workhouse style must be avoided. Ordinary houses arranged so that the inhabitants of each floor should find on it all conveniences, and have no interference from the other occupants, would be the most popular.

A number of new model cottages are being erected in the neighbourhood of Paris, near the Abattoir Rochechouart. Twelve are now finished, each containing four lodgings, composed every one of four rooms, to be let at 150 francs a-year a lodging. These are to be devoted exclusively to the use of labouring men and their families, and are to have water and gas supplied by the town: 150 more of these châlets are to be erected in different parts in and about Paris, and already 15,000 applications have been made to the Administration for lodgings in them. Notwithstanding all these attempts to better the condition of the Parisian working classes in this respect, they are but drops of water to the ocean that is required to do real service; and the labourer finds but too often the utter impossibility of satisfying the demand of the landlord, and is frequently driven from the lodging he or she has long found becoming more and more out of the reach of the scanty means the most arduous labour supplies, just at the moment when all other habitations are also put further than ever beyond attainment, and when the winter, with its increased expenses, is at hand. The increase in the rents is enormous, the greatest discontent prevails, and Paris was never in a more dangerous condition than it is at this moment, in consequence of the want of lodgings at moderate cost.

A Supplementary Report, by Mr. W. Fowler, architect, published by the Association for Promoting Improvement in the Dwellings of Labourers in Scotland, contains many useful details and illustrations. The directors cannot too emphatically state that three separate apartments are the least accommodation that ought to be afforded for a proper division of the sexes in a labourer's family. Cottages which have but two rooms for labourers who have wives and children are bars to any social improvement. The directors find "that they cannot profess to give plans for cottages having all the requisites for comfort and social decency at a commercial remunerating per-centage on the outlay of their erection; and they are confident that, where such is insisted on, these humane provisions must to a great degree be sacrificed; but the directors do profess to afford directions for building cottages where a plain style is adopted, which shall embrace all these, and yet yield such a per-centage on the outlay, as, with a corresponding increase in the efficiency of their occupants as labourers, will prove highly remunerating to both landlord and farmer."

The Blue-Book issued by the General Board of Health contains two reports,* one on the Chemical Aspect of the Metropolitan Water Supply Question, by Professor Hofmann, chemist to the Museum of Practical Geology, and Mr. L. Blyth, lecturer on Natural Philosophy at St. Mary's Hospital; the other an engineering report by Messrs. Austin, Ranger, and Dickens, the superintending inspectors of the Board.

From the latter of these reports, as the more extended and professionally important of the two, we shall first glean a few particulars. It may be desirable, however, before dealing with general conclusions, in the outset to recall to mind the various particular sources from which the metropolis is supplied with water.

The old metropolitan water companies were nine in number, but the Plumstead, Woolwich, and Charlton Waterworks have been recently established for the supply of a district comprised within 'the Act for the local management of the metropolis.'

Five of these ten companies take their supplies from the river Thames, namely,—The Chelsea, Grand Junction, Southwark and Vauxhall, Lambeth, and West Middlesex.

The other five companies have the following sources of supply:—

The New River Company's sources remain unaltered. The supply is obtained partly from certain wells and springs in various places, but chiefly from the river Lea, near Hertford.

The East London Company derive their water wholly from the river Lea, but it is now taken from a point considerably higher up the river than formerly.

The Kent Company have for their source the river Ravensbourne, the point from which the supply is drawn being unaltered.

The Hampstead Company, from the first, obtained their small supply from certain ponds and wells, but have more recently been assisted by supplies from the New River and the West Middlesex Companies.

The Plumstead, Woolwich, and Charlton Consumers' Pure Water Company derive their supply from a well and boring sunk into the chalk, above the town of Woolwich.

The Grand Junction, the Southwark and Vauxhall, and the West Middlesex Companies, we may here add, have established their new works on three contiguous plots of land, on the banks of the Thames, at Hampton, and have erected buildings of similar design, which combine to produce an important effect. The mains of these three companies, from Hampton to their several establishments in London, run in parallel direction, as shown on a plan given with the reports, as far as Twickenham; and, at the point

* "Dwellings of the Labouring Classes in the Metropolis," by Major-General G. B. Tremenheere. Knight and Co. Fleet-street.

* Reports to the Right Hon. William Cowper, M.P. President of the General Board of Health, on the Metropolis Water Supply, under the Provisions of the Metropolis Water Act. London, 1856.

of divergence from each other, means of communication between the three have been formed for mutual aid in case of accident or repair.

According to the return furnished by the several water companies in 1850, it appeared that 270,581 houses were then supplied with water, the gross daily quantity delivered having been 44,383,332 gallons. The supply of water to the metropolis has now, it appears, reached the enormous quantity of upwards of eighty-one million gallons per day, *it having been nearly doubled in the short space of six years.* It is furnished to 328,561 of the 340,000 houses which now form the aggregate within the Registrar General's district. Thus, the average daily supply of water for all purposes, which in 1850 was 164 gallons per house, is now, in 1856, 246 gallons per house. The total nominal engine power employed and in reserve is equal to 7,324 horses. The mains and branch pipes for bringing the water from the several sources, and distributing it in the districts, exclusive of the private service pipes, form a total length of 2,086 miles. The filter beds cover an area of upwards of 40 acres. Before the passing of the Metropolis Water Act of 1852, considerably more than half the supply was not filtered: subsiding reservoirs were in such case the only means of clearing the water of impurities in suspension: these are now for the most part employed as well as the filter beds, the total area of subsiding reservoirs in use being upwards of 141 acres in extent. The filtered water is stored in fourteen covered reservoirs, comprising an area of nearly 15 acres, and in four uncovered reservoirs, of not quite 3 acres, which are beyond five miles distance from St. Paul's. The cost of the new works executed under the Metropolis Water Act, 1852, and the recent Acts of the several companies, has amounted to 2,282,824*l.*; making, with the former expenditure, as shown by the returns of 1850, the cost of the entire waterworks of the metropolis *upwards of seven millions sterling.* Even this amount, however, will fall short of the total expenditure; for the intermediate outlays between the former returns and the passing of the new Acts, and the cost of many works in hand, but not yet complete, are not included in this sum.

The result of the investigation by the superintending inspectors is,—

"1st. That the requirements set forth in the commencement of our report, comprising the 1st, 2nd, 3rd, 4th, 14th, and 17th clauses of the Metropolis Water Act, 1852, have, in all essential respects, been fully and satisfactorily complied with by the several companies (the provisions for constant supply not coming into operation until the 1st July, 1857). The new works have not, in fact, been limited to what a bare compliance with those provisions would have fulfilled. Measures have been adopted for the general improvement of the supplies, which evince a proper anxiety on the part of the companies in the discharge of the duties of their position towards the public.

2nd. That having regard to the serious state of contamination to which many of the rivers and streams of the country are being reduced by the drainage operations carried out in the neighbouring towns, and by the direct discharge of the sewage without any means adopted for the prevention of the pollution of the waters,—a condition which is evidenced to the inhabitants of the metropolis by the suddenly increased pollution of the Thames itself at the points whence their water supply has but recently been drawn,—we desire to recommend that early attention be directed to the towns draining into the Thames and its tributaries, and into the Lea and Ravensbourne, above the present sources of supply, so that measures may be adopted with regard to the drainage of those places which will permanently preserve the supply of water to the metropolis in its utmost practicable state of purity."

The report contains a favourable account of the result of Clarke's softening process, as applied at the Plumstead, Woolwich, and Charlton waterworks. "This scientific and ingenious process," it is remarked, "no longer remains in the position of a beautiful theory of the laboratory, of which the practical application is doubtful, it having now been in operation for two years on so large a scale with eminent success and advantage." Some over-estimates of its advantages, however, are pointed out, although the reporters state that there are few cases in which they should hesitate to recommend its adoption.

On the important subject of their second general conclusion, they remark that "whatever amount of pollution the river may now derive from the towns along its banks [bad as it is, we may add], is as nothing to what it will be when drainage works, for which some of these towns are already preparing, will have been carried out." What remedy would be comprehensive enough to meet so tremendous an evil, short of compelling each town to contribute a share of the cost of sewage-tunnels along the whole course of the rivers Thames, Lea, and Ravensbourne, and all the way to the sea, it would be hard at this moment, perhaps, to conjecture.

Notwithstanding the expense to which the Lambeth Company have gone in sending up to Thames Ditton for their Thames water, it appears that the Lambeth water has shown "very little more organic impurity under chemical analysis than the Thames Ditton water, which has been substituted for it:" in other words, the new supply is little better than the old, and is likely to become still worse than it ever was. It appears, however, from the chemical report, that (though such has been shown to be the natural state of the water) the waters supplied to the metropolis now do not contain more than one-half the organic matter which was present in 1851—a circumstance attributable of course to the efforts and works of the companies, and not to the state of the river, which, in fact, seems to be becoming worse and worse in a rapidly increasing ratio.

The ordinary organic pollution of the Thames, Dr. Snow urges,* is not the greatest evil that humanity has to contend with, at least in cholera seasons. He has been at great pains to prove, both on previous occasions, and more especially in his recently published tract on this subject, that while water contaminated with the grossest organic impurities in ordinary seasons, may not display any very glaring or special malignancy, no sooner is that same water impregnated, even to a very small degree, with the peculiar fæcal products of cholera, than those who drink or otherwise use it in a potable shape are liable to be suddenly and violently attacked by the same disease.

In the conclusion of the tract alluded to, Dr. Snow says,—

"It is probable that, when the facts brought to light by this inquiry are sufficiently known, no one will deny the influence of impure water in promoting the mortality of cholera; but it must not be supposed that it is mere impurity of an ordinary kind that causes the disease, for there are innumerable facts to prove that ordinary impurities have no such effect, and that it is only when the specific morbid matter of the disease gains access to the water that cholera is propagated. Thousands of people drank water from their own neglected cisterns, during the late epidemic, as impure as that of the Southwark and Vauxhall Company, without ill effect. An inquiry made by the vestry of St. James's, Westminster, proved that the contents of a cesspool had been percolating for months through the 3 feet of earth which separated it from the pump well in Broad-street; but although hundreds of people were daily drinking the water, and cholera was extending fearfully in many parts of London, only a few scattered cases occurred in the streets near the pump till the end of August, when, a case having happened amongst the persons using the privy connected with the cesspool above mentioned, more than 500 persons were attacked within two or three days.

In the cases in which the cholera poison gains access to a limited supply of drinking water, such as a tank or pump-well, the outbreak it occasions is always sudden, violent, and limited; but when a river is the medium of the propagation of the disease, its progress is more gradual and extended, being diffused amongst the whole population using the water.

It is hardly necessary to remark, that every circumstance which proves the communication of cholera through the medium of water, corroborates the views, explained at the beginning of this paper, regarding its propagation in the crowded houses of the poor; for it cannot be supposed that a morbid matter, which can produce its specific effects after being diffused and distributed through a quantity of water, could fail to act in an undiluted state."

The deaths, the author urges (and as we have before shown from his first book), which occurred in the last epidemical attack of cholera on the south side of the metropolis, "were six times as numerous in the houses supplied by the Southwark and Vauxhall Company as in those supplied by the Lambeth Company," the former supplying the inhabitants with water from the Thames at Battersea, while the latter, by that time, had brought it from Thames Ditton. This difference he ascribes to the especial pollution of the Thames within the metropolitan limits with choleraic virus derived from the metropolitan sewers.

In illustration of a lecture given by Mr. John Leslie at the Polytechnic on Monday last, a notice of which will be found on another page, the lecturer introduced a very remarkable map of London, thrown on the disc from a MS. map prepared by the Registrar-General, showing the average annual mortality of the various districts during ten years (1841 to 50, inclusive), and marking in black colour those parts, mostly bordering the river, where the rate of mortality is highest. Let us say in a parenthesis that this illustration alone will justify a visit to the Polytechnic on Tuesday next, when the lecture is to be repeated. And what did this death-map show? Why, that while in Putney and in the Hanover-square district, the average number of deaths annually in every thousand of the population was 16, and in Dulwich and Sydenham 14 only; in Bermondsey it was 28; in part of Chelsea, 31; in Shoreditch, 33; and in part of Greenwich no less than 47! What more striking evidence could be adduced that there are accidental and local causes in operation tending to shorten life, which causes, as Christian men, as political economists, and as egotists simply striving to save ourselves, it is our paramount and most pressing duty to strive to remove.

* "Cholera and the Water Supply in the South Districts of London in 1854." By John Snow, M.D. Reprinted from the "Journal of Public Health" for October, 1856.

THE PROPOSED DECORATIONS AT ALNWICK.

This subject, discussed at the Institute of British Architects, on Monday evening last, is so important to architects, and so interesting to the public generally, that I trust that a few additional remarks may not be considered misplaced, especially as the solution of the difficulty appears to lie in a different direction from that pointed out by the speakers on that occasion.*

Every one agrees that when the Duke of Northumberland undertook to repair the degradations of preceding centuries, and to restore Alnwick Castle to its former position, he had only one course to pursue, and that he was perfectly right in adopting the baronial style of the

* We shall give an abstract of the paper read at the Institute, and of the discussion that followed, hereafter. Viewing the proposed Roman decorations at Alnwick as a palpably injurious mistake about to be perpetrated at a great cost, we at once give insertion to the following protest, although our own deductions would be different.

middle ages, and was fortunate in selecting an architect so capable of carrying out his views as Mr. Salvin, whose restorations have met with universal approval.

So far, therefore, as the exterior was concerned, there was no difficulty; but when the question arose as to how the interior was to be decorated, the duke paused before adopting the suggestion of his architect, that the Mediæval style should be employed there also, inasmuch as no instance can yet be pointed to in which the Gothic style has been successfully adapted to the refinements and elegancies of modern society, or so as to admit of such art being employed with it as shall be only of the highest and purest class. Mr. Scott and others will, no doubt, dispute this doctrine, but the public are quite clear on the point; and neither at Windsor nor Westminster, nor among any of the hundreds of modern castles and mansions of England can one be quoted which is free from picturesque barbarisms utterly unsuited to modern times. This may be remedied in some future example, but till it is done the duke exercised a wise discretion in hesitating before embarking in so hazardous an experiment.

Having cast off the trammels of the course that at first sight seemed most obvious and rational, his grace was at liberty to choose wherever he pleased; and after mature deliberation he decided that the style of decoration found in the Italian palaces of the sixteenth and seventeenth centuries was the most noble in itself, and most suited to the refinements of modern society. Having fixed on this, he employed a Roman architect to import literally into his Northumberland stronghold the style and decorations of the Farnese or Borghese palaces.

This may have been a "Hobson's choice," but it is certainly a most unfortunate and melancholy predicament for a nobleman to find himself in, and the result must always be so painful a discord, that no one can long remain satisfied with it. You approach the castle through Gothic gateways, flanked by battlemented towers, and every stone, and every association breathes of mediæval England in her noblest and most picturesque period. You pass the threshold, and in one second you are as in a pantomime transferred to an Italian palazzo, where nothing speaks of the locality, or recalls the Hotspurs and Percys of former days. Were there no windows or doorways the illusion might be kept up, but every opening throughout the castle betrays the discord, and tells painfully the tale of the want of art in the present day.

Inigo Jones did exactly the same thing when he replaced the portals of old St. Paul's by a Corinthian portico; but his path was clear, and he hoped to see the whole of the old building cleared away, and replaced by classical forms; but as he left it, it was a counterpart of Alnwick Castle, or, perhaps, a better illustration would be, if an architect were now to propose to add the portico of the Parthenon to the front of Westminster Abbey.

The mistake seems to be, the bringing together two complete and well-defined styles belonging to different ages and countries, and copying each so literally as to produce the illusion that we have before us an example of the style imitated. The discord is obvious, and no even partially successful result has ever yet been obtained by such means.

The true solution, I conceive, would have been to abandon in the interior all direct adherence to any known style, and to introduce into it every elegance and refinement that the skill or taste of modern times could suggest.

I should have proposed to divide the ceiling into panels which should be most suggestive of constructive requirements, and at the same time most pleasing in form: these I would have enriched with such mouldings as were most suitable and appropriate, and would have adorned them with such colours as would have produced the most harmonizing effect, using always the highest and purest style of art available, without reference to whether it approached nearest to the Greek or Gothic type. The walls might have been hung, as is now proposed, with the richest satin; but the patterns should have been the most elegant the looms of Lyons or Italy could produce, and where paintings or sculpture could be introduced they should have been the best of modern times.

There is no incongruity in the art of the fourteenth and fifteenth centuries, as introduced into the cathedrals of the twelfth and thirteenth centuries, notwithstanding its superior elegance and refinement; and there would be as little incongruity in the pure art of the nineteenth being introduced into a castle of the sixteenth century, where it would appear without affectation, as the inevitable result of the change of time, and as, in fact, the goal to which the former style was tending. Each style would correctly represent the age to which it belonged, though differing from each other in the same ratio as the manners and feelings of the present duke do from those of the early Percys.

The furniture, the liveries, the manners and customs of the inhabitants, would all have been in strict accordance with the decorations of the interior, and the obvious common sense of the arrangement would have satisfied every one of its propriety; whereas now, the feudal castle, the Italian palazzo, and the English ducal establishment, are three things no two of which are in accord,—and the obvious connexion between the first and the last is cut across by the interpolation of the foreign element.

At the same time, it may be observed that there is less difference between the highest utterance of any two styles of art than at first sight appears, and when constructive propriety is the basis of decoration, real incongruity is almost impossible; and as the style of the interior must be in perfect accordance with the manners of the inhabitants, there can be no more incongruity in its appearance than in modern lords and ladies inhabiting a stronghold of a feudal baron of ancient days.

Had the noble duke adopted this course, he not only would have saved himself from an expensive mistake, which ninety-nine people in a hundred will certainly condemn, but he would besides have conferred on the arts of his country a benefit which can only be rendered by one of his liberal and enlightened mind, combined with his wealth and exalted position. J. F.

THE ARCHITECTURAL ASSOCIATION AND THE INSTITUTE.

At a meeting on Friday, the 14th of this month, there was a good muster of members and other architects, to discuss the two letters received from the Institute of British Architects (which have already appeared in our pages), one proposing the amalgamation of the two societies, the other enclosing a copy of by-laws, which the Institute proposed to add to their present code, and asking the opinion of the Association upon them. The discussion was kept up till a late hour, those who joined in it expressing themselves as convinced of the goodwill with which the Institute had come forward in the matter; but it was urged that the members of the Association would, if they joined the Institute, have no voice in the management of that society, and that there would be a restraint upon that free discussion which they enjoyed at present, and it was ultimately decided to forward to the Institute a reply, stating that the Association thought it better to stand alone, as there appeared to be sufficient room for the two societies.

The following is a copy of the letter which was decided on:—

Architectural Association, Lyon's-inn-Hall, November 17, 1856.

To the Honorary Secretaries of the Royal Institute of British Architects.

Gentlemen,—We are instructed by the committee of the Architectural Association to address the following answer to your letter of the 17th of June last, which answer has been approved of at a general meeting of the members of the Association, convened for that purpose, and held on the evening of Friday, the 14th instant.

The committee desire hereby to acknowledge with sincere pleasure the many terms of sympathy expressed in your letter, and, above all, to thank you for the flattering proposal therein contained for the amalgamation of our society with that of the Royal Institute of British Architects.

After mature deliberation, the committee of the Architectural Association, at a meeting held on the 27th of September last, determined unanimously that it would not be expedient to recommend the amalgamation of the two societies, inasmuch as they believed that the interests of the profession would be best served by the two societies retaining their individuality; but in entering upon the consideration of a proposal of such importance to the younger branches of the profession, they were anxious to adopt the most liberal interpretation of your letter, and they therefore felt it necessary to ascertain the general opinion of the members of the Association.

The greatest obstacle to the proposed amalgamation was conceived to be that clause in the charter of the Institute, wherein the several grades of Fellows, Associates, and Students are defined,—whereas the leading principles of the Architectural Association are, "Equality of membership and perfect freedom of discussion." These principles have been found to work with considerable advantage to the society, and the committee saw, by the proposed union, that those who had met for years as equals, and as fellow-labourers in their art, would find themselves divided by distinctions, the justness of which the committee are unable either to appreciate or understand, and the utility of which is very questionable.

With regard to that portion of your letter suggesting co-operation with the Institute, the committee of the Association were most willing to meet your views as far as possible, and discussed the desirability of joining the Institute as a distinct body meeting under the same roof, and participating in the benefits of its library and its meetings; and, although this course appeared to have its advantages, yet it was thought that the independent feeling of our society would be sacrificed, and the present incentive to active exertion on the part of our members be lost, when the identity of the Architectural Association should be in danger of being merged with that of the Institute of British Architects.

In conclusion, the committee have endeavoured to consult the best interests, not only of the members of the Architectural Association, but also of the profession generally; and whilst they sincerely regret that obstacles should exist to prevent the amalgamation proposed, they do hope that the members of the Royal Institute of British Architects will assist the members of the Architectural Association in their sincere endeavours to improve themselves in their art; and also, as far as possible, to bring architecture so prominently before the public, that the art and its professors shall be more understood and respected than has ever yet been done.

The committee desire again to express their grateful thanks for the letter from the Institute, and hope that this answer will be received in the same spirit as must have dictated their letter.

We have the honour to be, gentlemen,
Your obedient servants,
(Signed)
T. W. Goodman, } Honorary
James Alfred Bunker, } Secretaries.

Amongst the speakers, were Messrs. Gray, Kerr, Truefitt, Young, Cates, Digby Wyatt, Hayward, Arthur Allom, Papworth, &c. &c. The majority of the members who spoke, wished it to be distinctly understood, that the Association was not merely a body of students, but that it also represented the junior members of the profession. Mr. Digby Wyatt thought that, as they grew older, they would look upon themselves as rivals to the gentlemen of the upper house, however friendly they desired to be at present. The government of the Institute was freely discussed, with goodwill, both by its own members and by those of the Association.

It was announced with respect to the memorial to the chief commissioner for an extension of time for the preparation of designs for the proposed Government offices, that Sir Benjamin Hall had declined to alter the date for receiving designs from native architects, urging that much less time had been given for the designs for the new Houses of Parliament. From architects not residing in the United Kingdom, however, designs will be received up to the 4th of April.

As a member of both the above societies, may I request a corner in your valuable journal to express my dissent, in common with many more, from the answer of the Architectural Association to the admirable letter of the Institute, expressing their desire to render every facility towards the amalgamation of the two societies, and forwarding a draught addition to the by-laws, now under the consideration of the council.

I think it should be well understood that the views therein expressed cannot be taken as the general opinion of the young architects of London, or even of the Association itself. There were but twenty-one voters at the meeting held on the 14th instant, specially called to confirm or annul a letter brought up by the committee, rejecting the proposals of the Institute *in toto*.

Of the twenty-one voters, eight were in opposition, while the Association numbers about 130 members. This reply, therefore, must not be taken for more than it is worth.

The graceful dignity with which the Institute has recognised the efforts of the Association, and the evident desire it evinces to further the ends for which it was constituted; the means it proposes to adopt for the additional convenience and advantage of its younger members; and the healthy tone of its unreserved invitation to join hands with them,—have certainly left the Architectural Association without excuse. Everything that could be done in consistency with the dignity of the Institute and the provisions of its charter has now been done, and the onus lies on the shoulders of the Association, who still persist in maintaining a rival position, most injurious to the true interests of the profession generally—its younger

members especially—disregarding the example of Mr. Tite in the past, and the additional inducements offered by the Institute of to-day.

Without disputing the fact that there is room for reform in the Institute—more particularly with reference to the class of Associates,—yet, let me ask, is it not reasonable to expect that the Institute will be far more ready to hear and to act from the suggestion of the members of its own body, than from antagonistic elements warring against them from without?

If the proposed changes in the charter (though what is wanted has not yet been very clearly defined) would be attended with very considerable expense, will not the increase of its members daily weaken the strength of that argument, and make that a matter of minor importance, which it cannot be said to be now? And must not their divided interests act injuriously to both societies?

But waiving monetary considerations, can the Association offer any such *educational* advantages as those proposed to be given to the graduates of the Institute by the regulations made by the council in pursuance of the new by-law now under consideration? Had the Institute passed these rules without submitting them to the Association, they might have been construed the product of rivalry; but now there is no room left for the accusation. And if the Association is weakened or crushed, it will have but to condemn its own short-sightedness.

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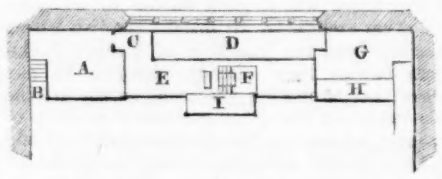

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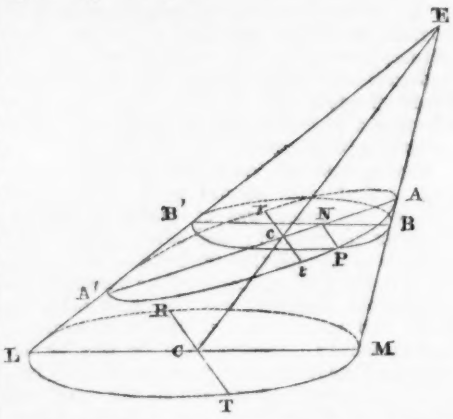

Let LEM be the cone formed as above described, E being the position of the eye, LM the circle of which we require a perspective representation. Let AA′ be the *picture-plane*, and BB′, another section parallel to LM, and which will evidently be a circle also (by sixth book of Euclid). Now, since AA′ and BB′ are in the same plane, therefore NP, which is perpendicular to BB′, is also perpendicular to AA′ (Euclid, book XI.).

Let AN = x, NP = y, AA′ = $2l$, then NA′ = $2l - x$.

By trigonometry, $\frac{NB}{NA} = \frac{\text{Sin. NAB}}{\text{Sin. NBA}} = \beta$ (say);

or $NB = NA \times \beta$.

So also, $\frac{NB'}{NA'} = \frac{\text{Sin. NA'B}}{\text{Sin. NB'A'}} = \frac{1}{a}$ (say);

or $NB' = NA' \times \frac{1}{a}$.

Since BB′ is a circle, it follows (Euclid, book VI.) that

$$NP^2 = NB \times NB';$$

$$\text{or, } y^2 = \frac{\beta}{a} \times NA \cdot NA' = \frac{\beta}{a}(2lx - x^2),$$

which is the well-known equation of an ellipse: therefore, the curve APA′ is an ellipse.

The foregoing does not invalidate the method of putting a circle in perspective by means of the circumscribing square and its diagonals and diameters, which is perfectly correct as far as it goes, and if correctly executed will in reality produce an *ellipse*. It must, however, be observed, that if RCT is a diameter of the circle, and at right angles to diameter LM, its projection, *rct*, will *not* be a *diameter* of the elliptic representation, nor will it divide that ellipse into two equal parts. This can readily be proved from the sixth book of Euclid.

A TAZZA OF WORCESTER WARE. — In our notice of the contents of the Ceramic Court, in the Crystal Palace, we were led to offer praise to Messrs. Kerr and Binns, of Worcester, for their praiseworthy and enterprising endeavours to maintain the reputation of the Worcester manufacture. Especial mention was made of their adaptations of the Limoges enamelling upon porcelain. We have since seen a tazza executed by them in this style, which displays admirable drawing, and a beautiful material. To effect such works requires so large an outlay, that the manufacturers cannot hope to be remunerated, unless they secure the sympathy of those in the higher classes who possess art feeling. The details of the tazza, even to the chasing of the raised gold, are perfect.

SEWERS AND THE SMOKE NUISANCE.

A CORRESPONDENT, who signs himself "Mercator," revives a proposition (several times made before),* to take the smoke of domestic chimneys into the sewers, and proposes thus to deodorize the latter. The writer says,—It must be evident to all that, if the smoke from a few large furnaces can be consumed, that emitted by the chimneys of dwelling-houses may be got rid of. The principle that has been successfully employed in the former case would answer equally well in the latter, and by this means the chimneys, which still vomit forth soot and blacks, would yield to science and modern improvement.

The consumption of coals in the metropolis is rated at 3,000,000 tons per annum.† A little more than 2,000,000 tons of these are consumed in private houses, so that they were always the principal cause of the smoke nuisance, and now render themselves doubly conspicuous, since the operation of an Act of Parliament has effectually cured the evil in the factories and workshops.

The great advantages of the proposed amelioration may be thus briefly summed up:—

1. The metropolis would be less exposed to the outbreak of fires, and conflagrations of every kind.
2. The general health of its numerous inhabitants would be materially improved.
3. Cholera and other epidemics, supposed to arise from the prevalence of bad odours, would not appear so frequently, and when they did come, would be less fatal in their effects.
4. The difficult question of ventilation would be solved.
5. Large chimneys not being required, the architect would have a field opened to him for roof-decoration.
6. The unsightly projections in dining-rooms, drawing-rooms, and other chambers, would disappear.
7. Great economy in the consumption of coal would be effected.
8. The householder's greatest pest—smoky chimneys—would be heard of no more.

The afore-mentioned results I propose to achieve, by means of chimneys closed at the top, so that no direct communication with the external air would be presented. The smoke being drawn downwards into the sewers would, in its downward course, carry with it the heated soot, uncontaminated with the moisture of the atmosphere, and would thus present it in the most favourable state to the gas-generating sewerage surface for the absorption of those smells which affect the atmosphere.‡ By coming in contact with the moisture of the sewers and the supernatant gases, the soot at once obtains an increased density, whereby the greater part of it falls on to the surface of the running fluid, leaving the fire under our engine-boiler only a small duty to perform in burning the remainder of the volatilized carbon and noxious gases. The soot enriches the sewers, and renders them valuable for agricultural purposes. It fixes and deposits the volatile salts, retaining in the sewerage its pristine invigorating and fertilizing qualities.

The draught required to draw the smoke into sewers, I propose to create by means of a fan,§ to be worked by a steam-engine, conveniently and ornamentally placed in the centre of a given block of houses.

The draught caused by the action of the fan at the back of the furnace of the steam-engine would draw the vapours from the neighbouring sewers over and through the fire of the furnace, which would be thus made to consume all those unprecipitated portions of carbon and noxious gases inimical to human life. In short, the fan draws the vitiated air from the apartments through the valves, the smoke through the apertures in the chimney conducts them both into the sewer, and then passes them through and over the fire, by which the water that generates the steam for the motive-power of the fan is heated.

The waste steam from the engine might be used to supply warm-water for baths, washhouses, or any purposes to which the poorer inhabitants of the district might turn it with advantage to themselves and the good of the community.

* Especially by Mr. Devey several years ago.

† See Henry Mayhew's "Great World of London." Part I. p. 29.

‡ Freshly ignited charcoal will absorb several times its own weight of ammoniacal gas, and soot does the same in due proportion. These are most important facts.

§ The size of the fan behind the engine-fire, or the number of its evolutions, must be increased in proportion to the area to be ventilated.

LONDON AND THE CHARTER OF SANITARY REFORM.

ON Tuesday, the 18th, Mr. John Leslie gave a lecture at the Polytechnic Institution, Regent-street, "On London, viewed from the Great Charter of Sanitary Reform, the Metropolis Management Act," using the telling map of which we have already spoken as his principal illustration. The following is an abstract of the principal points in the lecture:—

The metropolis consists of 78,029 acres, including 3,500 acres of water, equal to 122 square miles, the City of London being rather more than one of the 122 square miles.

	Per Centage. Acreage.	Per Centage. Population.
The Middlesex, or northern side, has	41·6345	73·89
The Surrey and Kent, or southern side, has	58·3655	26·11
	100·000	100·00

The assessable value will be about 12,000,000*l.* sterling, and consequently a penny rate will produce 50,000*l.* At the census of 1851 the total houses occupied and unoccupied, and then building, was 327,391, and the population, 2,362,236. A close approximation, he said, gave eleven millions of tons of water passing up from the sea every flood tide through London-bridge, and fifteen millions of tons passing downward through London-bridge in every ebb tide for the all-wise purpose of preventing deposits by the increased scouring power. He then urged the folly of diminishing this scouring power by abstracting all the sewage and rain waters, and carrying them away together in many miles of costly sewers and miles of flat-bottomed iron sewers all out of the ground, and exposed to every variation of atmospheric temperature and to the effects of frost and thaw, by the former of which the northern sewage may be stopped, and by the latter the metropolis and adjacent country deluged with the filth of the metropolis. He showed that the metropolitan area was nearly five miles longer on the south and Surrey, and Kent side of the Thames, than the Middlesex side, and maintained that the great error was at the basis of all the calculations of plans A, B, C, and D, of the Metropolitan Board of Works. The combination of sewage and rain waters in the same channels increased expenditure in sizes of sewers and pumping establishments, in the following ratio for every twenty-four hours' discharge:—

Sewage and house water	509,926 tons.
Rainwater	529,067 „
	1,038,993

The increase being on the sewage only 103·75 per cent.

Mr. Leslie then read the 135th clause of the great Sanitary Charter, and maintained that the intercepting sewers were to be for sewage only, and to be completed by the 31st December, 1860.

He then showed that the plans of the Metropolitan Board of Works required monster cesspools, to pond back the sewage 9¼ hours in every twelve hours on both sides of the river, and placed in juxta position his estimate of sewage, which he stated was purposely a great exaggeration of the truth. Human excreta, he said, combined with house-water supplies, was a known quantity of daily amount: rain was a known quantity of only 24 inches in a year; and maintained from these facts that it was the extreme of folly to combine the discharge of the two in the same channels, and preferred following nature's laws, to lead the rain into the nearest points of the river to where it fell, in such large, and uncertain, and distant days of each year.

He calculated:—

	lbs.
Human excreta, solid	0·375
„ „ fluid	2·5
Expected water supply of 5 cubic feet to every man, woman, and child of the whole population	311·6
	314·475

Multiplying this one largely exaggerated quantity, Mr. Leslie said, by what the population is expected to number fifty years hence, in the year 1906, 3,500,000, and the twenty-four hours' discharge would be 491,367 tons, and the discharge from 2,500,000 population would be 350,976 tons.

The lecturer considered that there should be no cesspool reservoirs to pond up the sewage, but the discharge should be constant into deep sea water, and every minute the pumps at the sea end of the sewer should be in action, and then *each* minute's discharge would be—fifty years hence,—12,270 cubic feet; at present, upon the exaggerated estimate, only 8,764 cubic feet. A circular sewer, he said, 10 feet in diameter, with an inclination of 2 feet per mile, would discharge 12,900 cubic feet per minute when only four-fifths full, being 630 cubic feet more than the total discharge from three and a half millions of population in the year 1906. This 10 feet circular sewer, two bricks thick in cement, would take 700 bricks per foot run: of which, with cement and labour, the cost price would be 2*l.* per foot; that he allowed 1*l.* per foot run for digging; 1*l.* per foot run for contingencies and profit to the contractors, and made the total 21,120*l.* per mile.

Thirty-five miles from Putney, through the agricultural counties of Surrey and Kent, would take this sewer into 78 feet 6 inches of sea-water at high water; 8¼ miles by land, and 10½ miles by water below Gravesend, benefiting the largest amount of population, there being 47,000 acres on the Kent side below Plumstead, with nearly 50,000 population, the sewage of which would, by this sewer, be kept out of the river, besides the sewage of the whole metropolitan area passing from the northern division in culverts under the Thames.

It is to be repeated on Tuesday, as we have elsewhere mentioned, and we may then have an opportunity to mention some of the other points referred to.

VENTILATION OF ASSEMBLY ROOMS.

A VERY simple method of ventilation adopted at Winchester College School, at the Town-hall at Basingstoke, and several large buildings in Hampshire, by Mr. Sharp, C.E. is found to answer completely, we are told. After the system had been in action the first season at the Winchester College, the head master, Dr. Maberly, said "he scarcely knew what the headache was, but prior to the ventilation being effected he had seldom been a day without it."

The vitiated air is drawn from the building through openings in the ceiling communicating with air-trunks in the roof; these trunks are connected with an upright shaft of metal constructed in the chimney, which is heated by the fire used for warming the building: by this means the air in the shaft is sufficiently rarefied to produce an *upward current*. In the summer season, a small gas-light is burned in the shaft: the gas is lighted at a small door at the bottom of the metal shaft, and produces sufficient draft for ventilation in the summer. Fresh air is admitted through plates of perforated zinc let into the skirting round the room, which are under control by the means of slides: these can be so managed as not to cause an uncomfortable draft; at least so we are told.

ST. MARY'S TOWER, TAUNTON.

THE long doubtful question respecting the restoration or rebuilding of this tower seems at last about to be determined, if we may judge from an appeal now in course of circulation by the churchwardens. It may well be understood that the guardians of this beautiful structure would long hesitate in taking any step whereby the removal of the present tower would be involved, and they have taken pains to ascertain from competent authorities whether it was possible to repair and extensively restore the tower or not. We ourselves strongly incline to the latter course. The recently-appointed churchwardens, determined to resolve upon some mode of action, applied, we are told, to Messrs. Scott and Ferrey again for their opinion; and although it was deemed possible by these gentlemen to effect a partial restoration and repair at a great cost, they thought no thoroughly substantial renovation could be promised, so that the bells might again be re-hung and pealed. Under these circumstances, the authorities have determined (if the requisite funds can be obtained) to rebuild the tower, precisely the same as the present one in design; drawings and measurements, photographs and casts, having been made by Mr. Giles, of Taunton, for effecting this purpose.

The probable cost is put down at 6,000*l.*

members especially—disregarding the example of Mr. Tite in the past, and the additional inducements offered by the Institute of to-day.

Without disputing the fact that there is room for reform in the Institute—more particularly with reference to the class of Associates,—yet, let me ask, is it not reasonable to expect that the Institute will be far more ready to hear and to act from the suggestion of the members of its own body, than from antagonistic elements warring against them from without?

If the proposed changes in the charter (though what is wanted has not yet been very clearly defined) would be attended with very considerable expense, will not the increase of its members daily weaken the strength of that argument, and make that a matter of minor importance, which it cannot be said to be now? And must not their divided interests act injuriously to both societies?

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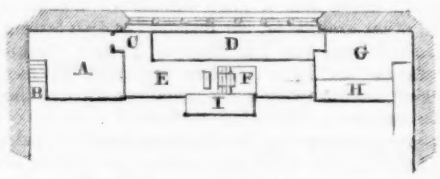

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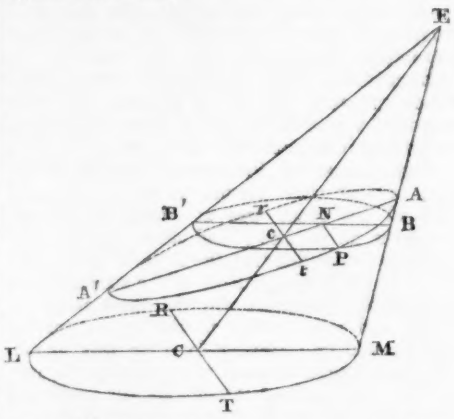
THE truth of the above proposition having been disputed, we propose, at the request of some of our correspondents, to submit to our readers a mathematical demonstration, which we hope will bring conviction to the minds of those who are capable of understanding the subject.

If we draw rays of light from a circle to the eye, they will form the surface of an oblique cone, having the said circle for its base. If, then, a plane (as the picture-plane) intersect this conical surface, the curve formed thereon will not be another *circle* unless the plane happens to be parallel to the base. That it will be an *ellipse* we demonstrate in the following manner, to any person acquainted with algebraic geometry:—



Let LEM be the cone formed as above described, E being the position of the eye, LM the circle of which we require a perspective representation. Let AA′ be the *picture-plane*, and BB′, another section parallel to LM, and which will evidently be a circle also (by sixth book of Euclid). Now, since AA′ and BB′ are in the same plane, therefore NP, which is perpendicular to BB′, is also perpendicular to AA′ (Euclid, book XI.).

Let $AN = x$, $NP = y$, $AA' = 2l$, then $NA' = 2l - x$.

By trigonometry, $\frac{NB}{NA} = \frac{\text{Sin. NAB}}{\text{Sin. NBA}} = \beta$ (say);

or $NB = NA \times \beta$.

So also, $\frac{NB'}{NA'} = \frac{\text{Sin. NA'B}}{\text{Sin. NB'A'}} = \frac{1}{\alpha}$ (say);

or $NB' = NA' \times \frac{1}{\alpha}$.

Since BB′ is a circle, it follows (Euclid, book VI.) that

$$NP^2 = NB \times NB';$$

$$\text{or, } y^2 = \frac{\beta}{\alpha} \times NA \cdot NA' = \frac{\beta}{\alpha}(2lx - x^2),$$

which is the well-known equation of an ellipse: therefore, the curve APA′ is an ellipse.

The foregoing does not invalidate the method of putting a circle in perspective by means of the circumscribing square and its diagonals and diameters, which is perfectly correct as far as it goes, and if correctly executed will in reality produce an *ellipse*. It must, however, be observed, that if RCT is a diameter of the circle, and at right angles to diameter LM, its projection, *rct*, will *not* be a *diameter* of the elliptic representation, nor will it divide that ellipse into two equal parts. This can readily be proved from the sixth book of Euclid.

A TAZZA OF WORCESTER WARE.—In our notice of the contents of the Ceramic Court, in the Crystal Palace, we were led to offer praise to Messrs. Kerr and Binns, of Worcester, for their praiseworthy and enterprising endeavours to maintain the reputation of the Worcester manufacture. Especial mention was made of their adaptations of the Limoges enamelling upon porcelain. We have since seen a tazza executed by them in this style, which displays admirable drawing, and a beautiful material. To effect such works requires so large an outlay, that the manufacturers cannot hope to be remunerated, unless they secure the sympathy of those in the higher classes who possess art feeling. The details of the tazza, even to the chasing of the raised gold, are perfect.

SEWERS AND THE SMOKE NUISANCE.

A CORRESPONDENT, who signs himself "Mercator," revives a proposition (several times made before),* to take the smoke of domestic chimneys into the sewers, and proposes thus to deodorize the latter. The writer says,—It must be evident to all that, if the smoke from a few large furnaces can be consumed, that emitted by the chimneys of dwelling-houses may be got rid of. The principle that has been successfully employed in the former case would answer equally well in the latter, and by this means the chimneys, which still vomit forth soot and blacks, would yield to science and modern improvement.

The consumption of coals in the metropolis is rated at 3,000,000 tons per annum.† A little more than 2,000,000 tons of these are consumed in private houses, so that they were always the principal cause of the smoke nuisance, and now render themselves doubly conspicuous, since the operation of an Act of Parliament has effectually cured the evil in the factories and workshops.

The great advantages of the proposed amelioration may be thus briefly summed up:—

1. The metropolis would be less exposed to the outbreak of fires, and conflagrations of every kind.
2. The general health of its numerous inhabitants would be materially improved.
3. Cholera and other epidemics, supposed to arise from the prevalence of bad odours, would not appear so frequently, and when they did come, would be less fatal in their effects.
4. The difficult question of ventilation would be solved.
5. Large chimneys not being required, the architect would have a field opened to him for roof-decoration.
6. The unsightly projections in dining-rooms, drawing-rooms, and other chambers, would disappear.
7. Great economy in the consumption of coal would be effected.
8. The householder's greatest pest—smoky chimneys—would be heard of no more.

The afore-mentioned results I propose to achieve, by means of chimneys closed at the top, so that no direct communication with the external air would be presented. The smoke being drawn downwards into the sewers would, in its downward course, carry with it the heated soot, uncontaminated with the moisture of the atmosphere, and would thus present it in the most favourable state to the gas-generating sewerage surface for the absorption of those smells which affect the atmosphere.‡ By coming in contact with the moisture of the sewers and the supernatant gases, the soot at once obtains an increased density, whereby the greater part of it falls on to the surface of the running fluid, leaving the fire under our engine-boiler only a small duty to perform in burning the remainder of the volatilized carbon and noxious gases. The soot enriches the sewers, and renders them valuable for agricultural purposes. It fixes and deposits the volatile salts, retaining in the sewerage its pristine invigorating and fertilizing qualities.

The draught required to draw the smoke into sewers, I propose to create by means of a fan,§ to be worked by a steam-engine, conveniently and ornamentally placed in the centre of a given block of houses.

The draught caused by the action of the fan at the back of the furnace of the steam-engine would draw the vapours from the neighbouring sewers over and through the fire of the furnace, which would be thus made to consume all those unprecipitated portions of carbon and noxious gases inimical to human life. In short, the fan draws the vitiated air from the apartments through the valves, the smoke through the apertures in the chimney conducts them both into the sewer, and then passes them through and over the fire, by which the water that generates the steam for the motive-power of the fan is heated.

The waste steam from the engine might be used to supply warm-water for baths, washhouses, or any purposes to which the poorer inhabitants of the district might turn it with advantage to themselves and the good of the community.

* Especially by Mr. Devey several years ago.

† See Henry Mayhew's "Great World of London." Part I. p. 29.

‡ Freshly ignited charcoal will absorb several times its own weight of ammoniacal gas, and soot does the same in due proportion. These are most important facts.

§ The size of the fan behind the engine-fire, or the number of its evolutions, must be increased in proportion to the area to be ventilated.

LONDON AND THE CHARTER OF SANITARY REFORM.

ON Tuesday, the 18th, Mr. John Leslie gave a lecture at the Polytechnic Institution, Regent-street, "On London, viewed from the Great Charter of Sanitary Reform, the Metropolis Management Act," using the telling map of which we have already spoken as his principal illustration. The following is an abstract of the principal points in the lecture:—

The metropolis consists of 78,029 acres, including 3,500 acres of water, equal to 122 square miles, the City of London being rather more than one of the 122 square miles.

	Per Centage. Acreage.	Per Centage. Population.
The Middlesex, or northern side, has	41·6345	73·89
The Surrey and Kent, or southern side, has	58·3655	26·11
	100·000	100·00

The assessable value will be about 12,000,000*l.* sterling, and consequently a penny rate will produce 50,000*l.* At the census of 1851 the total houses occupied and unoccupied, and then building, was 327,391, and the population, 2,362,236. A close approximation, he said, gave eleven millions of tons of water passing up from the sea every flood tide through London-bridge, and fifteen millions of tons passing downward through London-bridge in every ebb tide for the all-wise purpose of preventing deposits by the increased scouring power. He then urged the folly of diminishing this scouring power by abstracting all the sewage and rain waters, and carrying them away together in many miles of costly sewers and miles of flat-bottomed iron sewers allout of the ground, and exposed to every variation of atmospheric temperature and to the effects of frost and thaw, by the former of which the northern sewage may be stopped, and by the latter the metropolis and adjacent country deluged with the filth of the metropolis. He showed that the metropolitan area was nearly five miles longer on the south and Surrey, and Kent side of the Thames, than the Middlesex side, and maintained that the great error was at the basis of all the calculations of plans A, B, C, and D, of the Metropolitan Board of Works. The combination of sewage and rain waters in the same channels increased expenditure in sizes of sewers and pumping establishments, in the following ratio for every twenty-four hours' discharge:—

Sewage and house water	509,926 tons.
Rainwater	529,067 „
	1,038,993

The increase being on the sewage only 103·75 per cent.

Mr. Leslie then read the 135th clause of the great Sanitary Charter, and maintained that the intercepting sewers were to be for sewage only, and to be completed by the 31st December, 1860.

He then showed that the plans of the Metropolitan Board of Works required monster cesspools, to pond back the sewage 9¼ hours in every twelve hours on both sides of the river, and placed in juxta position his estimate of sewage, which he stated was purposely a great exaggeration of the truth. Human excreta, he said, combined with house-water supplies, was a known quantity of daily amount: rain was a known quantity of only 24 inches in a year; and maintained from these facts that it was the extreme of folly to combine the discharge of the two in the same channels, and preferred following nature's laws, to lead the rain into the nearest points of the river to where it fell, in such large, and uncertain, and distant days of each year.

He calculated:—

	lbs.
Human excreta, solid	0·375
„ „ fluid	2·5
Expected water supply of 5 cubic feet to every man, woman, and child of the whole population	311·6
	314·475

Multiplying this one largely exaggerated quantity, Mr. Leslie said, by what the population is expected to number fifty years hence, in the year 1906, 3,500,000, and the twenty-four hours' discharge would be 491,367 tons, and the discharge from 2,500,000 population would be 350,976 tons.

The lecturer considered that there should be no cesspool reservoirs to pond up the sewage, but the discharge should be constant into deep sea water, and every minute the pumps at the sea end of the sewer should be in action, and then *each* minute's discharge would be—fifty years hence,—12,270 cubic feet; at present, upon the exaggerated estimate, only 8,764 cubic feet. A circular sewer, he said, 10 feet in diameter, with an inclination of 2 feet per mile, would discharge 12,900 cubic feet per minute when only four-fifths full, being 630 cubic feet more than the total discharge from three and a half millions of population in the year 1906. This 10 feet circular sewer, two bricks thick in cement, would take 700 bricks per foot run: of which, with cement and labour, the cost price would be 2*l.* per foot; that he allowed 1*l.* per foot run for digging; 1*l.* per foot run for contingencies and profit to the contractors, and made the total 21,120*l.* per mile.

Thirty-five miles from Putney, through the agricultural counties of Surrey and Kent, would take this sewer into 78 feet 6 inches of sea-water at high water; 8½ miles by land, and 10½ miles by water below Gravesend, benefiting the largest amount of population, there being 47,000 acres on the Kent side below Plumstead, with nearly 50,000 population, the sewage of which would, by this sewer, be kept out of the river, besides the sewage of the whole metropolitan area passing from the northern division in culverts under the Thames.

It is to be repeated on Tuesday, as we have elsewhere mentioned, and we may then have an opportunity to mention some of the other points referred to.

VENTILATION OF ASSEMBLY ROOMS.

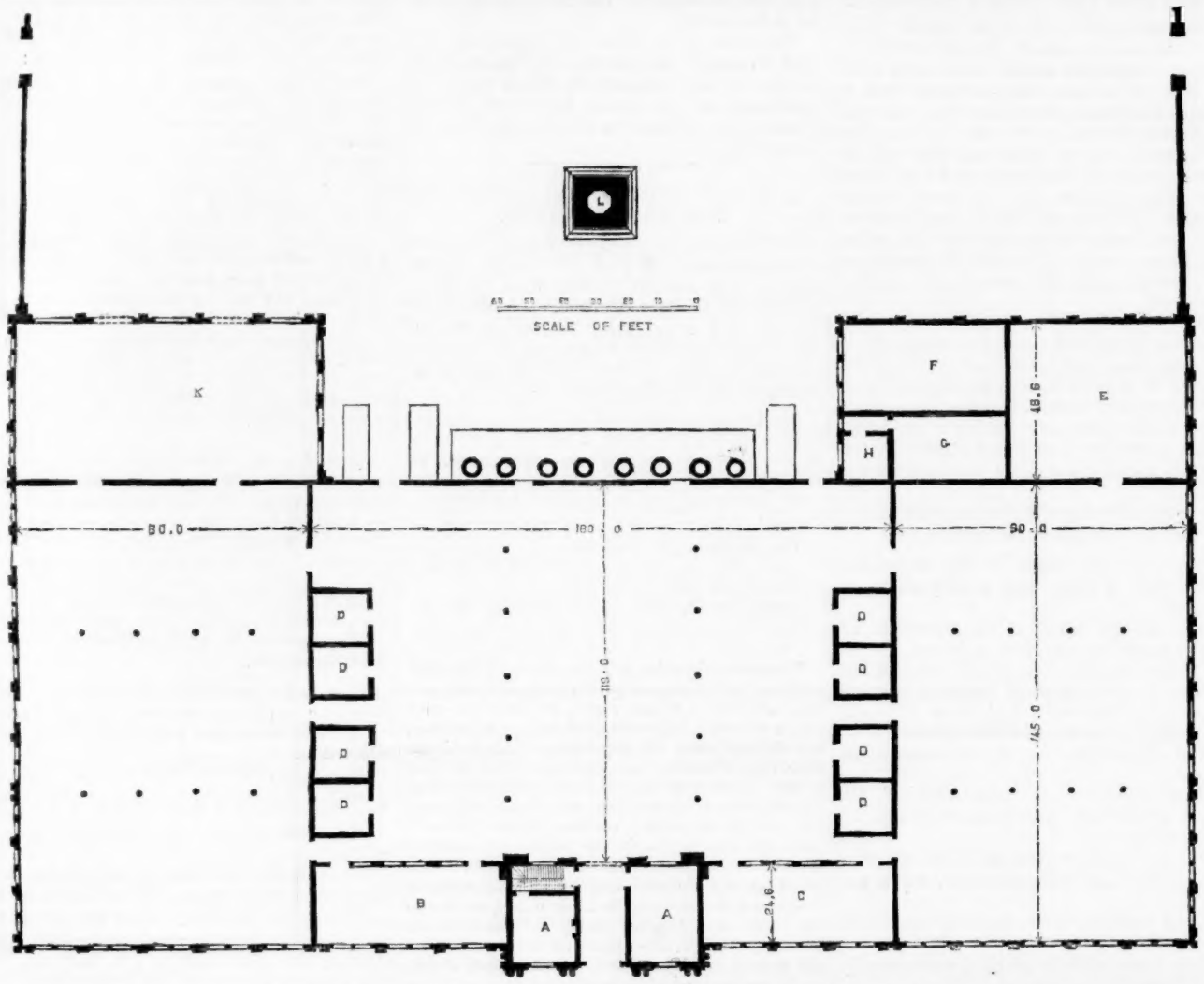
A VERY simple method of ventilation adopted at Winchester College School, at the Town-hall at Basingstoke, and several large buildings in Hampshire, by Mr. Sharp, C.E. is found to answer completely, we are told. After the system had been in action the first season at the Winchester College, the head master, Dr. Maberly, said "he scarcely knew what the headache was, but prior to the ventilation being effected he had seldom been a day without it."

The vitiated air is drawn from the building through openings in the ceiling communicating with air-trunks in the roof; these trunks are connected with an upright shaft of metal constructed in the chimney, which is heated by the fire used for warming the building: by this means the air in the shaft is sufficiently rarefied to produce an *upward current*. In the summer season, a small gas-light is burned in the shaft: the gas is lighted at a small door at the bottom of the metal shaft, and produces sufficient draft for ventilation in the summer. Fresh air is admitted through plates of perforated zinc let into the skirting round the room, which are under control by the means of slides: these can be so managed as not to cause an uncomfortable draft; at least so we are told.

ST. MARY'S TOWER, TAUNTON.

THE long doubtful question respecting the restoration or rebuilding of this tower seems at last about to be determined, if we may judge from an appeal now in course of circulation by the churchwardens. It may well be understood that the guardians of this beautiful structure would long hesitate in taking any step whereby the removal of the present tower would be involved, and they have taken pains to ascertain from competent authorities whether it was possible to repair and extensively restore the tower or not. We ourselves strongly incline to the latter course. The recently-appointed churchwardens, determined to resolve upon some mode of action, applied, we are told, to Messrs. Scott and Ferrey again for their opinion; and although it was deemed possible by these gentlemen to effect a partial restoration and repair at a great cost, they thought no thoroughly substantial renovation could be promised, so that the bells might again be re-hung and pealed. Under these circumstances, the authorities have determined (if the requisite funds can be obtained) to rebuild the tower, precisely the same as the present one in design; drawings and measurements, photographs and casts, having been made by Mr. Giles, of Taunton, for effecting this purpose.

The probable cost is put down at 6,000*l.*



PLAN OF SHELL FOUNDRY, ROYAL ARSENAL, WOOLWICH.

THE SHELL FOUNDRY, AND OTHER WORKS, WOOLWICH ARSENAL.

For some time past very considerable works have been going on in the Royal Arsenal, Woolwich, under the direction of Mr. David Murray, who holds the appointment of "Building Engineer," Messrs. Lucas, Brothers, being the builders. To these we have at different times alluded, and in our present number we give a plan of the new Shell Foundry, now approaching completion, and an external view of the central portion of it. It is constructed of red brick and stone. In other parts of the Arsenal, the new Gun Foundry for example, ornamental moulded brickwork has been introduced with very good effect. It will be seen from the plan that the area of the Shell Foundry, roofed in, is very considerable. The height of the chimney is no less than 223 feet 9 inches from the ground. The first brick of this was laid on the 2nd of April, and the last stone of the cap was set by Capt. Boxer, R.A. superintendent of Royal Laboratories, on the 15th of September last. It swallowed up about 290,000 bricks. The foundation of concrete is about 38 feet square and 23 feet deep, with courses of York landings. It is altogether a very excellent piece of work.

The area of the arsenal was about 139 acres until last March, when an addition was made by enclosing 114 acres of the adjoining marshes. A very large portion of the roads has been laid with granite pitching and iron tramways. The gas-works are rapidly approaching completion, and will be put into working order very shortly.

The large iron Ordnance Foundry and Boring Mill are being pushed on with much vigour. A large storehouse has also been finished lately, which has a frontage towards the river of about 235 feet.

The Rocket establishment is completed, and will soon be in an efficient state of working. The Composition establishment has been occupied now some short time. These two last consist of a very large number of detached buildings.

The Clothing establishment, although not in the Arsenal, is being erected under the direction of Mr. Murray, and now makes an imposing addition to the old Field Depôt near the barracks. While the boundary-wall, enclosing the marshes, and detaching the Arsenal from the surrounding property, is rapidly approaching completion: it is about a mile and three-quarters in length.

References to Plan.

A. A. Offices.	F. Boiler-room.
B. Smithery.	G. Engine-room.
C. Repairing-room.	H. Blowing-room.
D. D. D. Stores.	I. Cupola Stage.
E. Drilling Machines.	K. Coke Shed.

L. Chimney.

THE "NEW ROAD," LONDON.

At a time when from A to Z, from Stratford to Notting-hill, all are occupied in writing upon the embellishments of our public roads, and on the enlargement of our thoroughfares, permit me to call your attention, and through you the attention of the powers that be, to the *non*-embellishment and the contraction of one of the most important of our metropolitan roads,—"The New Road."

It is in the memory of all that at one time, from Lisson-grove to the Vinegar-yard, this road was flanked on each side by gardens: true, they were hardly kept with the ordinary neatness of English Cockney-gardens, yet, still, gardens they were, and as such admitted the free circulation of air. We have seen the corner-house replace the Michaelmas Daisy by a wooden box and table: we have seen the "Sweet-smelling wall-flower" give place to the "fragrant weed," and the London Pride changed into the Shining Pewter. We have observed the menagerie raise coop upon kennel, kennel upon coop, and the stone lion and stag look with silent contempt on the encaged live-stock. The ladder then raised its head to show the uninitiated how the uppermost coop was placed, and then the cowl crowned the whole. Up to this point, perhaps, little might be said; but the humble repairing tailor, whose sign-board was hid between two of these establishments, now in self-defence must advance his work to the pavement, and hence bricks and mortar. His near neighbour now takes the hint: a shop is built, and over it rooms, according as he is blessed with a family; and thus the gardens give way to irregular unsightly shops.

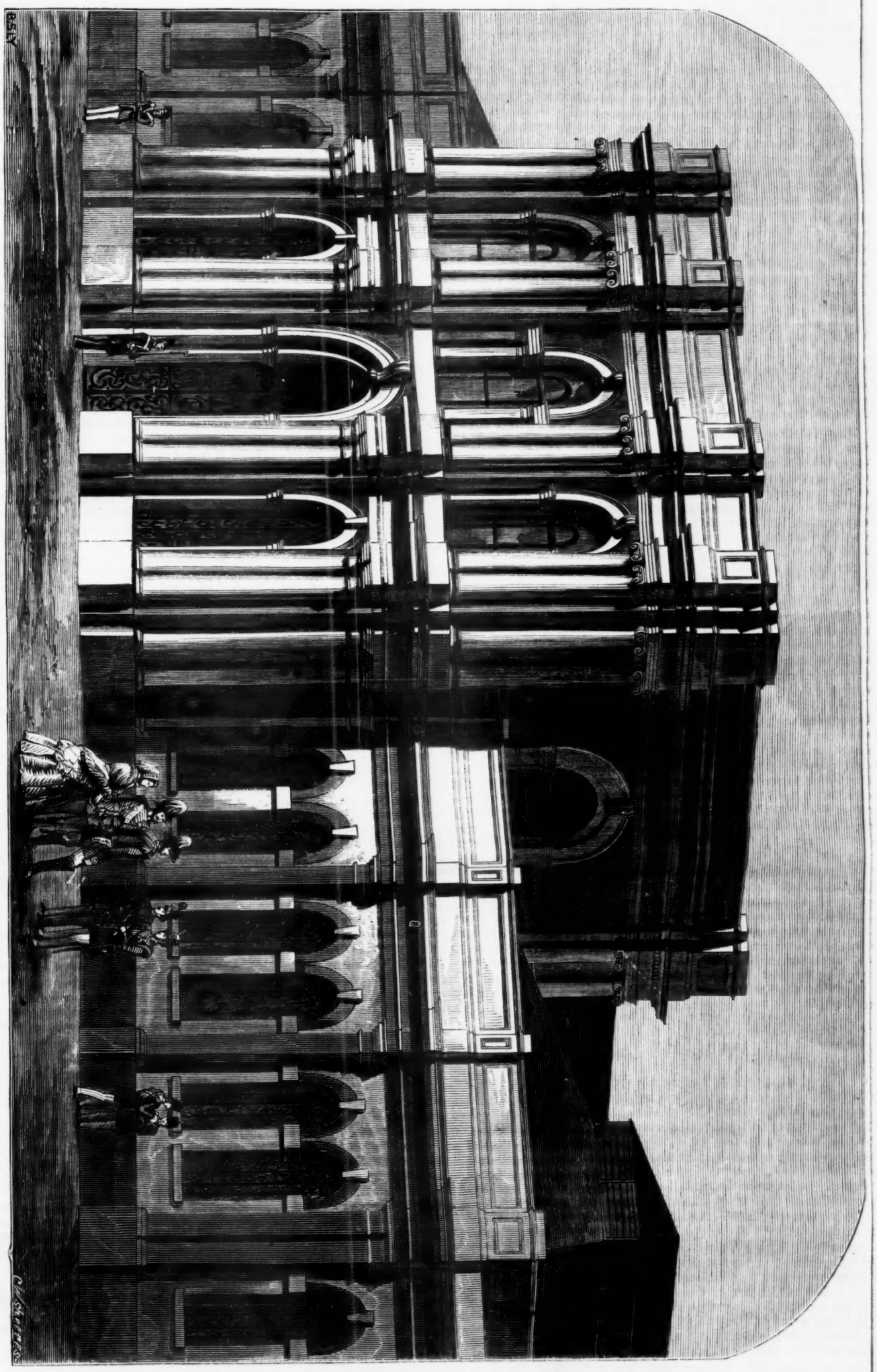
But the eye is not alone offended: if we glance at the part lying between Tottenham-court-road and Albany-street, we cannot fail to remark the contracted roadway and restricted footpath, in which even now with difficulty the traffic operates. Should this traffic but increase a little, we shall then hear of a deputation to the Board of Works for the enlargement of this part, and then the long bill of indemnities to shopkeepers, demolitions of houses, &c. &c.: all this a little forethought might have prevented, and still may, in part.

King's-cross again is another example; and, indeed, these remarks apply to many other roads entering London, and which should, in my opinion, form the subject of immediate and attentive consideration.

If the taste of the Londoners should turn towards boulevards, perhaps this is the finest site in London for such purpose, and each row of houses offers in itself a fine scope for the improvement of street architecture.

An unemployed C.E.

Barrack Improvements. — The Government appear to have at last resolved to carry out an improvement, on a small scale, for which we have long contended, namely, the provision of separate accommodation for soldiers' wives. At Chatham, 6,000*l.* are about to be expended in providing separate rooms apart from the single men for married soldiers; and at Preston barracks, we also observe, a number of dwellings of a similar kind are about to be erected.



THE SHELL FOUNDRY, ROYAL ARSENAL, WOOLWICH.—Mr. David Murray, "Building Engineer."

PROVINCIAL NEWS.

South Weald (Essex).—The new schools at South Weald, Essex, erected under the superintendence of Mr. Teulon, of London, at the sole expense of the vicar, the Rev. C. A. Belli, have been recently opened. The building consists of a school and school-house. The school runs parallel with the road, with its centre window set in a gable, with a tympanum occupied by a sculpture by Forsyth,—a guardian angel over children. The east and west windows are pointed, with plain tracery. The house which runs back the depth of the school is one story high, having all its rooms on the ground floor. The style is Early Middle Pointed, built in brick with freestone window frames. The east gable is surmounted by an hexagonal bell turret of stone. The interior of the school is of white brick worked with red, in a mosaic. All the arches are in alternated voussoirs of black and red, both internally and externally. The windows are glazed with suitable painted glass, presented by Sir Digby Neave, Bart. and Mr. W. Coope. The works are by Mr. Smith, of North Weald.

Chatham.—The authorities have given directions for plans to be prepared for a new hospital for the use of the troops, which will be built near the huts at Brompton, contiguous to the Casemate barracks.

Devizes.—The erection of the new corn-exchange building is said to be hindered by the fact that all the tenders are considerably above the sum named by the architect, Mr. Hill (viz. 1,500*l.*), as the required amount. The lowest tender was 350*l.* above this estimate, and the highest was between 1,200*l.* and 1,300*l.* in excess. The result is that the project is postponed till additional subscriptions can be obtained.

Weston-super-Mare.—A public meeting was held at the town-hall here, on Tuesday in last week, for the purpose of receiving a report from the committee appointed to examine the several plans for a new town-hall, when the ground-plans and elevations from Mr. Lysaght's designs, which the committee had approved of and recommended out of twenty, were accepted and adopted.

Bridgnorth.—The new market buildings are being completed, and before the commencement of another year will be in use. Mr. R. Griffiths is the architect. At a recent meeting of the town council, the lighting of the hall was taken into consideration, when it was resolved to have a central chandelier with twelve lights, and two others with eight lights each; to be suspended at a height that would not interfere with the line of vision. It was also resolved to have two side bracket lights near the platform. Mr. Griffiths produced a number of designs for the proposed chandeliers; and it was ultimately agreed that the chandeliers be procured from Messrs. Warner and Co. of London, after pattern No. 1, furnished by that firm. The cost of the chandeliers is estimated at about 60*l.* The windows looking into Listley-street Mr. Griffiths was directed to fit up with cast-iron frames and thick glass; one at least of the panes to open for ventilation to the butchers' market.

South Staffordshire.—The South Staffordshire Waterworks are progressing. After some difficulty with the first contractor, says the *Staffordshire Advertiser*, the reservoir at Lichfield is rapidly progressing, under the direction of Mr. J. Boys, the present contractor. The land purchased from the Earl of Bradford for the reservoir at Walsall has been handed over to the same contractor, the first sod of the reservoir being turned by the chairman of the company. The pipes for conveying the water through the district are now being laid down near Walsall. They have been produced by Messrs. Cochrane, of the Woodside Ironworks, near Dudley.

Hereford.—The Hereford cattle-market and sewerage have been executed, and the accounts finally wound up, at 450*l.* under the contract sum. The cattle-market, which covers an area of four acres, fitted up with cattle and sheep pens, and a shed 640 feet long and 24 feet wide, covered with corrugated galvanized iron, was opened on the 19th ult.—the tolls received on that day being 95*l.* The sewerage was completed on the stipulated day named in the contract. About 600 houses have been connected with the main sewerage during the execution of the works: about 200 houses are deriving water from the new waterworks. The water is pumped by a 20-horse engine, by Messrs. Simpson and Co. from the river Wye, into a reservoir of 103 feet above the river level, and capable of holding four millions of gallons. It is afterwards filtered in two filtering-beds before it enters the main. The contract amount for the whole of the works was 22,000*l.* The works were begun in May, 1855, and the inhabitants already appreciate the beneficial effects of these sanitary works. It is estimated that the cattle-market tolls and water-rate will pay the interest on the money borrowed for constructing the works. Mr. T. Curley, of Hereford, was the engineer, and Mr. William Moxon, of Dover, the contractor.

Liverpool.—On Wednesday in last week, it is said, water from Rivington reached Prescott for the first time, and the local *Mercury* states that it is expected that before the next meeting of the council, the water will be brought to Liverpool.

Elgin.—The new Bank buildings in Elgin are now roofed in and slated. "The Royal," says a local paper, is built of polished freestone from the Hospital Quarry, and is in the Doric style, and three stories in height. It occupies the west corner of North-street. The contractor is Mr. Lamb. The North of Scotland Bank is on the site of the Trades-hall. It is built of polished ashlar from the Newton Quarry, and is in the Corinthian order of architecture. It is likewise three stories in height. Mr. F. W. G. Urquhart is the contractor. Messrs. Reid, architects, designed both these buildings.

CHURCH-BUILDING NEWS.

Winwick.—The church of St. Michael, Winwick, has been restored and reopened. It is cruciform in plan. The transept windows have been opened and restored, as also a window on the north side of the nave. The tower arch has been opened and restored, at the west end of the church. The roofs of the nave and transepts are executed in oak and pitch pine, and are copies of the original roofs. The material and workmanship were provided by Messrs. Clarke and Barrett, by whom the restoration of the carcase of the fabric has been executed. The whole of the seating, together with the pulpit, prayer-desk, and font, are new, but the architect has preserved every remnant of tracery which remained of the old seating, and has copied the character of the old seats in the formation of the new. The whole of the internal fittings have been executed by Messrs. Ruddle and Thompson, of Peterborough. Besides the complete restoration of the church, the chancel has been entirely rebuilt. The latter was completed about three years ago, at a cost of 500*l.* laid out by the rector. The cost of the present restoration is about 1,200*l.*; so that the entire cost of the restoration is about 1,700*l.*; and the whole of this amount has been raised by the rector and parishioners, except about 150*l.* and this deficiency has been nearly cleared off by further contributions. The restorations have been carried out under the superintendence of Mr. E. F. Law, architect.

Mortimer (Reading).—The new church at Mortimer (West End) has been consecrated. The lord of the manor, Mr. Richard Benyon, of Englefield House, has erected the church, which is capable of accommodating about 200 persons, and has provided also a residence for the clergyman, for whose services the church has been endowed by the same gentleman.

East Molesey.—On the 30th ult. the Bishop of Winchester consecrated the new church of St. Paul, Kent Town, East Molesey, Surrey, which has been erected by Mr. F. J. Kent. The church is built in the Decorated style of Gothic architecture, and will consist, when finished, of a nave, with north and south aisles, chancel, with south organ chapel, and vestry on the north. The steeple will rise from the west end of the south aisle. At present only the chancel and three bays of the nave are erected, the arches being built up with a temporary wall of brick, so as to be capable of further enlargement: the columns of the nave arches are formed of massive blocks of unpolished granite, those of the chancel arch being polished Purbeck marble. The chancel is fitted up with open oak benches, placed stall-wise, and the altar is elevated on three steps. The sill of the south window of the chancel is lowered, so as to form sedilia for two clergymen.

Abingdon.—A vestry meeting was held on Thursday in last week, to receive a report with reference to the contemplated restoration of the tower and spire of St. Helen's church. It has now been determined to proceed with the work immediately. At a vestry meeting held some time since a report of Mr. Street, the diocesan architect, was read and discussed, and, upon the proposition of a ratepayer, it was determined to have the opinion of some other practical person, and Mr. J. H. Stacy was applied to for the purpose, but he declined to undertake the duty. Mr. Wilkinson, a local architect, was thereupon requested to make a report, the reception of which was the business for which the present vestry was called. Both reports were now read, and each recommended the adoption of immediate steps to restore the tower, the east side of which, it appeared, had bulged to the extent of 7 inches, occasioning considerable disorganisation of the fabric; and as it was the feeling of the meeting that the time had arrived when it would be inexpedient to delay the restoration of it, a proposition for a committee to be appointed to examine and select a plan, and proceed to carry it into effect, and lay before a vestry a report of the amount of the contract, was unanimously carried.

Pucklechurch.—The parish church of Pucklechurch was re-opened for divine service on the 4th inst. The old chancel of the church has undergone complete repair, from designs by the late Mr. Carpenter. The seats are all of the same proportions. A new stone pulpit and carved font have been substituted in the room of the others, and the gallery at the west end has been removed.

Tiverton.—The new chapel of St. John, in Pitt portion of Tiverton parish, Devon, was opened for divine service on the 1st inst. The building consists of nave, 43 feet by 21 feet, entered by a porch; chancel and arch, 18 feet 6 inches by 15 feet. The style is geometrical, the roofs open, of oak, that of the chancel boarded. Two bells, from the ruinous chapel which has given place to the new edifice, are hung in a turret at the west end. The walls are of the local stone, with quoins of Hanham stone, and Bath stone dressings. The outlay, aided by the materials of the old chapel, is about 800*l.* raised by subscription amongst gentlemen of the neighbourhood. Mr. Ashworth, of Exeter, is the architect, and the work has been carried out by Mr. Parish, of Tiverton.

Doncaster.—The time, says the local *Gazette*, is rapidly approaching, when the contractor for the rebuilding of the parish church will deliver into the hands of the Building Committee the work, so far as is comprised in the terms and extent of the existing contract. The committee, with the full sanction of the town, commenced the rebuilding of the church upon a scale which could not be entirely completed with the sum then subscribed. Hence, the contract was so arranged and divided, that the work might be stopped as soon as the nave had been carried up to the point where the tower commences—in the event of there not being sufficient funds to proceed with the remainder of the architect's scheme. In about two months from the present time, this stage will be reached. Then, the question will have to be asked—shall the contractor proceed with the second portion of the contract, namely, the tower? Or, for the want of sufficient funds, must the committee be compelled to relieve him from further obligations? In that case, all the arrangements of scaffolding, all the complications of machinery, the experience of workmen, the facilities of conveyance, and a long *et cetera*, will have to be dispersed and rendered comparatively useless; involving an extra cost of 2,000*l.* certain—probably more—whenever the time may come for the work to be resumed. This expensive contingency should be taken into the most serious consideration.

Blackburn.—The design of Mr. T. Oliver, jun.

architect, has been selected by the committee for the new Congregational Church about to be erected at Blackburn, in Lancashire. It will be entirely of stone, and have a tower and spire.

Teviothead.—The new church, which has been erected at the expense of the Duke of Buccleugh, was opened on Sunday before last. The style of the new building is Early English. The plans were furnished by Mr. Cowan, the duke's clerk of works at Bowhill.

Glasgow.—Among the improvements being carried out in connection with the cathedral, is the heating of the nave as adopted some time since in the Choir, or Inner High Church. The cost is estimated at 300*l.*

A HINT ON GLASS PAINTING.

My intention in this letter is to point out certain æsthetical views upon the above-named subject. At present, we are too grotesque and unnatural in the treatment of our subjects. We do not study truth sufficiently. This fact is now acknowledged by painters in oil, and the pre-Raffaelleite school are working upon this hypothesis. I would introduce this pre-Raffaelleitism into glass painting; but of course never attempt, as in the last century, to imitate oil painting, or try to gain the effect of that art, or in any way make the glass painting appear like a picture, but always let the following idea be predominant. The great object is to create a *glass* painting. Let the figures and drapery be natural; the position also. Do not use unnatural colours, and introduce absurdities in the shape of green wings to angels: use the colours of nature, and do not have too many; for, in modern glass, too minute mosaic is a failure; small pieces of red and blue appear at a distance purple; this is, as all know, from the different manufacture of the glass. Modern is even in thickness, the old is uneven: they were not able to manufacture glass of even thickness, and, consequently, from inferior manufacture they obtained those gem-like tints. The chief object to be attained should be distinctness, so that when you view a glass painting at a distance, you may perfectly see each tint and each figure, and thus understand the subject. Those leads, as Mr. Winston suggests, which cannot form outlines, should be hidden by the saddle-bars; and let there be always relief and perspective, as they harmonise with Gothic architecture. We want a new school: at present we are but servile imitators, obtaining all the faults of the old, but none of its beauties: study old glass, but don't copy it, for it did not harmonise with the Gothic architecture, because there was often no relief. Let our new school try to attain this, and they will succeed, if they keep to these leading rules. The old glass paintings were often unnatural, whereas Gothic architecture is truth all over.

OBSERVER.

INQUIRY AS TO FALL OF BRIDGE NEAR DARLINGTON.

A GREAT deal of evidence has been given at the inquest on the bodies of the two labourers, John Goldsbrough and John Wood, who were killed by the fall of the bridge in course of erection at Over-Dinsdale, near Darlington, and the inquest was adjourned from day to day, for four days, in consequence. It is quite impossible that we can enter into all the mass of evidence and opinion offered,* but we must select enough from the more important part of it to give some idea of the grounds on which a verdict of manslaughter was recorded against the inspector of the works.

William Dodds, carpenter, who on 4th inst. was taking out the centre of the arch nearest to the Yorkshire side of the Tees, stated that he observed a crack in the wall between the old work and the new, which led him to suppose that the new work was "dying," and settling from the old work of the abutment. He went through the arch to examine the other side and saw a similar crack, about 6 feet long, and close to the abutment on the Yorkshire side, above the arch. Goldsbrough asked him if he thought the bridge would fall, and he said he thought not. Got upon the bridge on the Durham side and passed along to the second of the four arches,—the first being a land arch. He then saw the fourth arch—the first from the Yorkshire side—fall from the abutment, and give way. The third arch rose up, on the falling of the fourth, and, subsiding, fell,—before the fall of (and while witness was still standing on) the second. The land-arch stood. The old abutment on the Yorkshire side, and the old portion of the three piers which carried the wooden viaduct, did not fall. The arch which first fell was rebuilt while the work was in progress, having given way.

John Howison, bridge-surveyor, county Durham, deposed that he prepared the plans and specifications. The work was taken by Mr. Richard Cail, of Durham, for (he believed) 635*l.* Witness appointed Christopher Turnbull, mason, as inspector. The arch that was rebuilt gave way because the old abutment slipped back against the bank. Means were taken to make the abutment secure, and it had proved to be so. The bridge was private,—the property of the Rev. W. S. Temple. Believed that the weight of the fourth arch, pressing upon the pier, had caused it to lean over towards the Durham side. The fall then took place—the first arch remaining because the pier was thicker, and not so high. It was Turnbull's duty to see that the old abutments and piers would carry the new work. It was not usual to build new arches on old piers. Good bricks and good cement were used. Bad bricks were brought at the commencement, and others were substituted.

William Taylor, foreman of the masons, ascribed the fall of the bridge to the giving way of the foundation of the pier under the fourth arch.

David Kerr, foreman of the bricklayers, agreed with Taylor as to the cause, and also as to the goodness of the bricks and cement.

Ralph Harrison, of Hurworth, cartwright and joiner, deposed that he was dismissed about a fortnight before the fall, because of something he had said as to the bridge coming down. He had mentioned to Turnbull that the fourth arch was giving way. Turnbull asked him what he thought the cause to be, and witness told him that was his look-out. Believed the reason to be the badness of the cement and the wideness of the joints.

Mr. James Trowsdale, of Stockton, contractor, said the arches had not been placed on new solid springing-stones, as specified. The joints in the brickwork were too wide, and the cement had been overdone with sand. These things were in the province of the inspector. In his opinion, the arches fell in consequence; and the piers were fractured in that way, and not by the yielding of the foundation.

Mr. Joseph Stephenson, C.E. was of opinion that the arches fell because a sufficient weight had not been put upon the haunches. The bricks were bad, the cement not good, and the workmanship was very defective. The inspector should not have allowed this. Some cement picked out by witness from the standing arch with his knife crumbled in his hand.

Mr. H. Marshall, acting on behalf of Mr. Cail, said that no blame could be attached to him in any way, Mr. Howison and his inspector having departed from the specifications in omitting the springers.

Mr. George Mason, C.E. Darlington, deposed to departures from the specifications and defective work. The sand, being three quarters loam, was unfit for use. The cement and some of the bricks were not good. Saw nothing to lead him to the conclusion that the foundations had shrunk. Would not endorse the plan. Would not have made such a design himself. It was the inspector's duty to see that the materials and workmanship were good.

Mr. Cail deposed, that he agreed with Hanson, of Masham, for bricks at 21s. 6d. per kiln, and rejected them as bad. The cement was from Erle's—(stated by Mr. Mason to be one of the best houses in the trade). There being an inspector over the works, he naturally expected that he would see to the workmanship being good. On his (Mr. Cail's) part, there was no stint.

Mr. R. Hodgson, of Whitwell, near Sunderland, C.E said the mortar of the old work was very bad indeed. The old piers, Nos. 1 and 2, were considerably disturbed in the masonry down to the foundation, and the want of substantiality in the work below the offset might tend very materially to produce the falling of the bridge. There was great risk in turning arches on such piers, unless properly built. The standing arch he considered to be fair average work. Erle's cement was unobjectionable. The sand was bad unless the loam were carefully separated. The joints were not particularly thick, and bricks were much cheaper than cement. The engineer was responsible, and then the inspector. The arches were too slight, and in great measure led to the fall of the bridge, together with the want of a through springer course on the top of the piers. The half-rings of the arch were not properly bonded into each other by heading bricks. Would have taken down the piers to the level of the springers, and rebacked the arches entirely with new work. Had known bridges come down entirely from wet weather.

Mr. B. Lawton, of Newcastle, contractor, confirmed Mr. Hodgson's opinion as to the fall; as also did Mr. E. B. Reed, of Newcastle, contractor. The latter said he *could not have built a better bridge for the money:* would not have expected it to fall, but would have seen the architect as to the plan, and have objected to leaving the old piers standing above the springing part: below these, would have had no objection to build such a bridge.

The jury remained in deliberation for four hours, and more than once had to request the assistance of the coroner. Their verdict was in these words:—"The jury are of opinion that the deceased John Wood and John Goldsbrough came by their deaths in consequence of the falling of Over-Dinsdale bridge on the 4th of November, 1856, and that the fall of the bridge was caused by gross neglect on the part of Christopher Turnbull, the inspector of the works, against whom we return a verdict of Manslaughter."

Turnbull was accordingly committed to Durham, to take his trial at the winter gaol delivery. The Foreman of the jury further said: "The jury are also of opinion that blame is due to John Howison, architect of the bridge, and Richard Cail, the contractor, for having deviated from the original plan and specification." The Coroner: But that blame does not, in your opinion, amount to criminal responsibility? The Foreman: Not the slightest.

* A very full report of the greater part of this evidence will be found in the *Darlington Times* of 15th inst. together with the summing up by the coroner.

THE RELATIVE VALUE OF LABOUR, SKILLED AND UNSKILLED.

A PAPER was read by Mr. Chadwick (late of the Central Board of Health), "On the Future of Manufacturers and of Manufacturing Labourers, and the Future of Agriculture and of Agricultural Labourers," at the agricultural section of the recent Congress of Bienfaisance at Brussels, and by the Congress directed to be printed in the Belgian *Moniteur.* In the first part of his paper Mr. Chadwick shows, by statistical evidence, as one of the results of his investigations as a commissioner of inquiry into the labour of young persons in factories, that in the earlier and more rude stages of manufactures, manual labour chiefly was required, but that the general tendency of improvements in machinery and processes is to reduce mere muscular toil, to put more and more of machinery for the economy of labour under one management, and to require a larger proportion of intelligence, skill, and trustworthiness, on the part of the operative—qualities which could only be obtained, and maintained permanently, by improvements in wages and general condition.

In respect to the future of the labouring classes in agriculture in England, it appeared to him to be under influences similar to those which promised favourably for the labouring classes in manufactures.

From particular inquiries which I have made, he continued, in various parts of England, I am assured that in agriculture as in manufactures, wheresoever labour-saving machines have been introduced, or labour-saving improvements in processes have been effected, more labour, of a higher quality, and better paid, has been required. At present, one great practical barrier to improvement in agriculture is the intractability, from ignorance and general low condition, of the labourers.

A quarter of a century ago there were riots, in which labour-saving machines were broken, but better views have now begun to prevail, and labourers have refused to do thrashing work by the flail, because, as they have justly and laudably said, that was work for a machine, which they would not degrade themselves by performing. On the other hand, common agricultural labourers, when they have been allowed to join gangs of Lancashire navvies, and have been "alimented" and seasoned to their tremendous discipline, on their return have astonished the farmers by doing an ordinary day's agricultural work before noon, and by putting their spades on their shoulders and going away for the rest of the day. A noble friend brought down to his estate in Dorsetshire a foreman accustomed to superior labour at piece-work. Judging of what would be his answer, I said to this foreman, "Will you not get this work done cheaply? Here the labourers are got for only 8s. a week." "But they would be dear at 6s." was the reply. "How is it here with your other class of artisans?" I inquired, "your journeyman bricklayers, for example, what sort of workpeople are they?" "Such as from their wages you, sir, would expect," was the answer. "And what wages are these?" "About 12s. per week." "And how many bricks do they lay in a day?" "Not more than between 300 and 400." "And how many do your town bricklayers lay, to whom you pay double wages?" "More than 1,000 a-day!" was the answer.

The most eminent of the "navvies" in England come from the hill districts of sandstone-grit and

granite in Lancashire and other northern counties, where there are favourable sanitary conditions of pure soft water and forced ventilation, and some natural drainage by winds and storms. Their alimentation, too, has been generally good. Some of the leading navvies have represented to me that they consider eleven pounds of meat per head per week as a necessary of life for good work, but I should not accept this as to the species of diet as an absolute dogma, for they themselves have admitted to me that eaters of oatmeal and potatoes (with milk), though in great quantities, have done good work with them: what, however, appears to be certain is, that a superior alimentation at the least is required, though it is by no means the sole requisite, and mental as well as bodily stimuli are needed for the attainment of superior work.

The superiority of a highly alimented and skilled labour has been maintained in every clime. A friend of mine, a civil administrator in India, the Right Hon. Holt Mackenzie, informed me some time ago that he had made a note of the comparative cost of Indian, Chinese, and English labour when he was in India, and that the general result was, "that for some works an English workman, of average efficiency, was equal to several Chinese, and one Chinese equal to several Indians (Bengalese), and this independently of the advantage or disadvantage of the tools employed. And the conclusion I drew," said he, and the conclusion which I too wish now to enforce, "was, that for estimating the cost of labour, or of the work done, there could not be a worse standard than the wages of the labourers."

Much in this instance might be ascribed to climate, but the spectacle has been presented in Calcutta of Lancashire artizans, imported at high wages, doing work there under the shade of umbrellas held over them by Hindoos, engaged at low wages to attend and perform this service. In the course of discussions on the subject with the members of the Congress met here, I have received much confirmatory testimony upon my view of the facts. One member of the Congress, a merchant, informs me that he has had ships built abroad, and also ships repaired in every principal port in the world; but he avows that, notwithstanding the very high wages of our shipwrights, he has found their labour as cheap as any he has elsewhere met with. In respect to agricultural labour, another of our colleagues, a landowner in Poland, who has been some years in England, and who has studied its agriculture, states to me that he found one German labourer equal to two Polish labourers; but that three Polish labourers—and these not serfs—were required to do work equivalent to one average English agricultural labourer. In this extreme difference, however, the difference of tools was included, with the difference of skill and energy. Admirable work is done by Anglo-Saxon men in Canada, and in the United States of America; but I repeat that I do not ascribe the difference of result mainly to race, because, as I have observed, the labour of Englishmen, depressed by maladministration and pauperism, is often as inferior as any other; and because depressed Irish labourers, when put into suitable training and condition, are found, according to the acknowledgment of English labourers, to keep step with the best.

SAFETY FOR BUILDING OPERATIVES.

I KNOW that it is only to utter a truism to say that it is the duty of every man to promote by all the means in his power the safety and well-being of the community; and for this reason I admire the disinterested philanthropy of such institutions as the Royal Humane Society, the Royal Society for Saving Life from Fire, the Life-Boat Society, and others of cognate design. But probably there are few persons more exposed to the risk of severe or fatal accident than the various operatives engaged in the erection of large buildings, or in the decoration or repair of churches and other large interiors; and, notwithstanding the generally very firm and scientific construction of scaffolding, one cannot but remark how needlessly exposed the workmen are to accident by the use of loose boards to work upon, and by the absence of protection on the street side. The suggestion which I therefore venture to make to builders in general is, that a rope-net should, as a matter of course, be stretched across *the front* or that part of the front of every scaffolding on which men are at work, and that a similar net or tarpaulin (unless the boards are bolted or otherwise fastened down) should be securely placed *under* the stage of boards in use, convenient and safe openings being left, or temporarily made for passing up materials. I would recommend also that a rope-net or tarpaulin, or sail, or several, should be invariably secured close under the boards on any extensive scaffolding erected for the decoration or repair of spacious interiors. The precautions described would not cost much, and would probably prevent many serious and some fatal accidents, not only to the workmen themselves, in the event of a false step backwards, or of an ill-secured board, but also to passers-by, from the fall of planks or bricks, or other materials. The records of our hospitals could tell a sad tale of broken limbs and loss of life from accidents in building operations, to say nothing of the destitution of widows and orphan children consequent upon them.

A LONDONER.

METROPOLITAN BUILDING ACT.

Additions, Alterations, and other Work.—In repairs affecting the construction of any external or party wall, the Act renders notice compulsory on the part of the builder. It is obvious that if any portion of such party or external wall be removed or pulled down, so as to render it necessary to rebuild the same, the construction of such wall is "affected" to the extent of such rebuilding. As regards rebuilding, the Act of 1844 made the pulling down of one story, or the extent of one-fourth the surface or superficies of front, a sufficient ground for condemning all other irregular wood partitions or other portions of a building. A most dangerous license is permitted by the present Act, which would allow a six-storied wooden house to be rebuilt in woodwork in the three upper stories, as the Act says one-half is to be measured in cubic contents, and by a subsequent notice the lower portions might also be rebuilt in woodwork. How cubic contents are to be measured is not explained, or whether the removal of roof is decisive on this point. The doctrine of superficial area of a building is far preferable to cubic contents, but the matter referred to is only characteristic of this loosely-drawn Act. The object of this is to explain that a rebuilding is not a repair, and that by the word "repair" is meant only such work as applies to the surface or facing of a wall.

A DISTRICT SURVEYOR.

Fee Case.—An additional story has just been erected, under my superintendence, on a house in Clerkenwell. The district surveyer declined taking the fee for the addition, viz. 1*l.* 3s. 9d. and claimed the sum of 3*l.* 6s. 3d. maintaining a fee was also chargeable for raising party-wall of one adjoining house, and party-wall and chimneys of the other. The raising was in both cases above the roof of adjoining house. The magistrate decided that the district surveyor was entitled only to the fee for the addition, of 1*l.* 3s. 9d. and he had to pay the costs.

W. P. G.

*** We advised the district surveyor to the same effect, before the case went to trial, in our notices to correspondents, October 25th.

Projecting Eaves.—We have just roofed in two houses with projecting eaves. Our ground landlord requests that we shall cement the projecting faces, according to the new Act, section 26. The district surveyor tells us we must cover it with zinc. If we put cement, he will make us alter it. As we have neither time nor money to lose, we appeal to you to settle the dispute between us.

P. and J.

*** It is still a question with some, if simply *covering* the eaves with fire-proof material fully complies with the requirement of the Act in this respect. If we admit, with the magistrate whose decision on this point we recorded some time ago, that it does so, then cement will serve the purpose as well as zinc.

GLASGOW ARCHITECTURAL ASSOCIATION.

ON Thursday in last week, Mr. C. H. Wilson delivered a lecture to the members of the Glasgow Architectural Association, on the subject of Glass Painting. The mechanical appliances necessary for the successful prosecution of the art were first treated of, and described. The lecturer remarked that the very imperfections and coarseness of the material employed by the glass painters of old gave their works a superiority over those of modern artists. The glass now used was too good, and allowed the rays of light to pass so directly through, that the windows were entirely wanting in that richness and solidity which was the distinguishing beauty of old painted windows, the glass of which broke and dispersed the rays of light. When modern glass was used for painted windows, the sun, when it shone upon them, appeared behind as a round fiery ball; while through the old windows the disc of the sun was not visible at all, and the only effect of their illumination by the sun was to increase their brilliancy. If we would have good painted windows, we must manufacture coarse glass for the purpose. Speaking of the three different styles of glass painting—the mosaic, the enamelled, and the mosaic-enamelled—the lecturer commended the British school for generally adhering to the first-mentioned, as the use of enamel so interfered with the transparency of the glass, that the windows so treated resembled a painted blind. This was, however, almost the only praise he was disposed to allow to the British artist, for as draughtsmen and designers they were far inferior to their continental rivals.

TO ARCHITECTS.—COMPETITION.

PRIZE OF FIVE POUNDS! *

Now, knights of the pencil, the compass, and square,
Arm yourselves for a tempting campaign.
Your paper lay down, your colours prepare:
Such a chance you'll not meet with again.

Attend then, I pray, all of ye who may,—
Of paper and pen make selection:
To Tom Sykes write—though him you may'nt like,
Of the ground, for plan and section!

But to him enclose,—or he'll oppose
Your having it, I'll be bound,—
Seven "bob" (the sum fix'd), so stump up like "bricks,"
The prize to be won is "FIVE POUND."

And mind! you're required, before you're hired
By this fine Burial Board,
To name the rate you're prepared to take,
For attendance at Castleford!

When doubtless they expect to pay
(Oh, who'll be so deluded?)
Some three per cent. on money spent;
The premium (!) included.

Builders likewise, for you there's a prize,
Such as rarely appears in these pages:
For enclosing four acres (what rare undertakers,
To offer such excellent wages)!

Erecting a lodge (be sure 'tis no dodge);
Building chapels and laying down drains;
Keep within bounds, for NINE HUNDRED POUNDS
Is the sum you're to have for you're pains!

Now each of you ought, if you're caught
By this stupendous 'lur'ment,
To ask the Board to further afford
The expenses of your interment.

For you cannot long, be you e'er so strong,
Live on scanty food or raiment,
And you'll scarce procure (of that be sure)
Either by such poor payment.

E. G. B.

A STATUE FOR THE FOUNDLING HOSPITAL.

A TARDY act of justice has placed a statue to the memory of the founder of this hospital, Capt. Coram, on the stone structure, in the centre of the entrance-gates. The work is by Mr. Calder Marshall, R.A.; and the expense of it, comparatively small, has been defrayed by private subscription. The figure, which admirably represents the philanthropist, as handed down to us by Hogarth, is 8 feet high; and, besides being a just compliment to so good a man, will relieve the monotony of a line of low buildings hitherto offensive to the eye. It is executed in Caen stone, and is to our minds very satisfactory. It is to be hoped that the stone has been indurated.

MASTERS AND MEN: THE HALF-HOLIDAY.

HAVING read in your useful paper of November 8th ult. an article on the half-holiday movement, by a Master in the "building trade," you will allow me perhaps, as an operative in the same trade, to make a few observations on the same subject. A diminution of the hours of labour must be regarded as a great boon to the working classes, although I do not think the "half-holiday" would be such a boon as many of my fellow-workmen do. I quite agree with the "Master" about the inapplicability of the rule, and, indeed, I think it would militate against the working man's interest, as I will endeavour to show. For instance, a workman out of employ has a small chance of getting employment on a Friday or Saturday, owing to Saturday being a *short day*; much less chance he would have of getting employment on the latter part of the week if his employer had to give him a *half-day*. I cannot see, except in factories or public works, how such a rule could be applied. There are other objections I could state against the half-holiday, but I forbear on account of taking too much space.

Now, Mr. Editor, I would ask for a diminution of the hours of labour, not as a holiday, but as a necessary means of allowing the working man more time to cultivate the faculties of his mind, both moral and intellectual, and I need not tell you how little time the workman has under the present system for such purposes. It requires him not only to devote the greater part of his time, but a great part of his life, to provide for the necessaries of his existence, and those depending on him; at least the energies of his body and his mind are so much exhausted, that he is totally unfit to pursue any useful study. He may gulp down some light read-

* See advertisement in the *Builder*, November 15th, 1856.

ing, or something of that sort, but he cannot apply his mind to any subject that requires the exercise of thought. If he tries, he invariably feels drowsy, and soon falls asleep over it. But I am trespassing too much on your time. What I would say is this—Why could not our day's labour be fixed at eight hours instead of ten? That, Mr. Editor, would be a great boon to the working man, and I question very much whether either our employers or the public would suffer much by it. With respect to our employors, a sufficient time might be allowed to finish their present contracts before the rule came into operation; and as to the public, I have a very different opinion of it from what the "Master" has, to think it would emphatically refuse it.

ANDREW DAVIDSON, Bricklayer.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

THE general meeting of the members of this institution was held on the 5th inst. at the house of the institution, Newhall-street, Birmingham; Mr. S. Lloyd in the chair.

The Secretary having read the minutes of the previous meeting, held in Glasgow, the officers and council for the next year were nominated for election at the ensuing annual meeting, and several new members were elected.

The first paper read was a "Description of the Ventilating Fan at Abercarn Colliery," by Mr. E. Rogers, of Abercarn. This is a simple construction of revolving fan, employed for ventilating a coal-pit by mechanical means, instead of the ordinary mode of furnace ventilation. The fan is placed alongside the top of the pit, and is of large size, running at a comparatively slow speed: it is formed of eight vanes, fixed on a horizontal shaft, on the end of which is a crank driven by a small direct-acting steam-engine. The plan of ventilating mines in this manner, by employing large exhausting fans moving at a slow speed, is the invention of Mr. James Nasmyth, of Patricroft, by whom the present fan was designed and constructed.

The next paper was "On the Application of Steam Power to Agricultural Purposes," by Mr. W. Waller, of Lincoln, and formed the continuation of a previous paper on another branch of the same subject.

The last paper was a "Description of a Steam Pile Driver," by Mr. R. Morrison, of Newcastle-on-Tyne. The machine consists of a steam cylinder and piston, carried on an upright framework: the piston-rod itself, being very large in diameter, and of great length, acts as the hammer to drive the piles, being raised by the steam in the cylinder and then let fall on the top of the pile. The whole machine, with steam boiler and engine, is carried on a framework on wheels, which runs along on the top of the piles already driven, as the work progresses, without requiring any additional framing to support it.

After the meeting, Mr. F. Osler, of Birmingham, exhibited a gyroscope of a large size, for the purpose of illustrating the stability of the axis of rotation of a revolving body. A new steam pressure-gauge was also exhibited, by Mr. John Inshaw, of Birmingham.

LIVERPOOL ARCHITECTURAL SOCIETY.

THE fourth meeting of the current session of this society was held on the 12th, at the Royal Institution, Colquitt-street. Mr. S. Huggins, the president, occupied the chair.

Mr. W. H. Weightman, the secretary, announced various donations; and Mr. G. F. Chantrell exhibited an invert for sewers made by Mr. Cliff, of Wortley, near Leeds.

The discussion on the Liverpool Building Act was then resumed.

The Chairman, in opening the discussion, said he could not think that the sources of English law were so corrupt or so impotent as to justify the fears expressed by Mr. Picton at the last meeting. But if they were, when we knew that the Building Act we had was really bad, and that it was in the power of architects and builders to make a better, there would be something cowardly in abandoning the attempt to get another lest we should get a worse one. If they gave a worse one, then it would prove that something else wanted reforming as well as the Building Act. He felt bound to add that he saw no sufficient reason why there should not be a national Building Act, applicable to all towns in the kingdom.

Mr. John Hay said he did not see what necessity there was for a Building Act at all. He had been doing work in Glasgow and Edinburgh, neither of which places had a Building Act, and neither of which felt the want of one. He had also been doing work in London, but, though he had to come under the powers of a Building Act there, he certainly did not find anything so monstrously absurd in that Act as in the Liverpool Act.

Mr. Kilpin defended the Act, advising that they should rather—

> "Bear the ills [or bills] we have,
> Than rush to others that we know not of."

Mr. Picton followed on the same side of the question, and, after some other speakers had addressed the meeting, the proposition that the society memorialise the town council to take measures for obtaining an amended Building Act, was negatived by a majority of nine votes against seven.

COMPETITIONS.

Blackfordby.—The committee appointed to carry out the rebuilding of the chapel of St. Margaret, in answer to their advertisement received about thirty sets of designs, many of which possessed the usual qualification of being in cost far beyond the funds at the disposal of the author. After long consideration, the committee have decided to adopt the design of Mr. Stevens, of Derby, and intend to commence the work early next year. The present very dilapidated chapel is considered to be one of the oldest ecclesiastical buildings in the county (Leicester), its principal feature being its simplicity: it consists of nave and chancel, under one long roof, with bells in a turret at the west end: the windows are of the lancet form, a triplet at the east end, and of the plainest character: the floor has the peculiarity of being formed with a considerable inclination from the east to the west end.

The Liverpool Wellington Monument.—A large number of designs for the proposed monument to Wellington in Liverpool, have been, within the last few days, sent in by various competitors, and are now awaiting the decision of the committee. We trust that the designs will be exhibited to the public for a few days *before* the selection is made; for, although the monument is to be erected by subscription, the public have a vital interest in securing monuments calculated to raise, not lower, the standard of taste.

Liverpool Museum.—We are requested to mention, that the idea of exhibiting the rejected sketches has been given up.

MARINE CEMENTS.

THE following is an abstract of a paper on "The Materials employed in Marine Works," presented to the French Academy of Sciences, by M. Chatoney, engineer of the Ponts-et-Chaussées, and M. Rivot, mining engineer. A favourable report upon it has been made by a committee, consisting of the following gentlemen;—MM. Chevreul, Poncelet, Dufrénoy, and Marshall Vaillant.

Argillaceous or silicious limestone requires much pulverising before being subjected to the heat of the kilns, in order to produce a good quality of hydraulic lime or cement. A thoroughly compact texture, and a sufficient quantity of carbonate of lime at the surface, to protect it against the action of the sea-water, are necessary conditions of stability; but the best chemical composition of the materials can only be determined practically by experiments made almost on the very spot where the works are to be constructed.

Excellent silicious hydraulic lime may be artificially obtained by submitting to a moderate heat a mixture of 70 to 80 parts of pure limestone, and 20 to 25 parts of fine sand or flint; a definite silicate of lime ($Si. O^3 + 3 Ca. O.$) which in forming a hydrate takes up six atoms of water. The more intimate the previous mixture of the materials the better.

The argillaceous hydraulic lime produced by burning either natural or artificial mixtures of limestone and clay, is not found to be so well adapted for use. The proportion of 20 to 22 parts of clay to 80 parts of limestone is found, upon the whole, to be the best. When the product contains too large a quantity of free lime, it is found advisable to use rather a clayey sand in mixing the mortar: this renders it more binding, and gives it greater power of resisting the action of sea-water. Too much clay would be very injurious, so that great care should be taken, and special experiments made, wherever this latter plan is adopted.

Cements which set quickly, and are prepared under moderate heat, are always difficult to manage in marine works, as they contain no free lime, and, consequently, their hardness is all that preserves them from the influence of the sea-water. They may, however, be improved by adding a certain proportion of lime, and letting the mixture stand a considerable time.

Natural or artificial cements, well burnt, and containing only a small portion of quicklime, such as those of Parker, the Medina, or the Portland, owe the great solidity which they acquire under water almost entirely to the presence of the hydrosilicate, as $Si. O^3 + Ca. O. + H. O.$ contains less water by half than the corresponding silicate produced in the hydraulic lime or cement, which is burnt at a lower temperature. These are found to answer best for works which are constantly immersed. They would probably not answer so well for those which are exposed on each side to the effects of water at varying heights.

Artificial pozzolana but seldom gives good results. With natural pozzolana fat lime should be used in preference to hydraulic lime, and it is most important to submit the mixture previously to a long soaking in a small quantity of water. This plan is adopted by the Dutch engineers, and tends to account for their remarkable success.

Sea water differs much from fresh water in its effect on different kinds of mortar and cement, not only from the constant and often violent action of the tide and waves, but from the various salts, carbonic and frequently hydrosulphuric acid held in solution.

Sea salt generally retards the setting of mortar and cement: the salts of magnesia exert but little action on free lime, or on the aluminate of lime.

The proportions of carbonic and hydrosulphuric acid vary much in different localities: they exert an action from the first moment of immersion until complete decomposition is effected, or at least till the cement becomes solid and impenetrable. They act first upon the free lime, and then upon the aluminate.

It has been noticed that where shells are very abundant, submarine works become covered with a sort of calcareous coating, which effectually protects them against all further action, and this protective influence of the marine animals may be best imitated by adding to the mortar or cement employed, free lime, in a proportion which must be determined experimentally for each locality.

Particular stress is laid on the following qualities, as essential to the formation of good hydraulic mortar:—

It is essential that the materials should be thoroughly pulverized before mixing, so that the combination may be as perfect as possible.

Sufficient free lime must be present to allow the carbonic acid in the water to combine with it, and form a protective coating of carbonate.

A long soaking of the materials is advisable, in order that the chemical combinations necessary for the ultimate stability of the mortar may take place before it is actually used.

Miscellanea.

THE LATE MR. POWELL, ARTIST.—We have received two communications in reply to some observations on this gentleman in the *Art-Journal*, asserting that the writer is wrong in his estimate of the deceased artist. One of our correspondents says,—"From a knowledge of what the late Mr. Powell's character was, during a considerable period of his life, and up to the time of his death, I feel justified in asserting that he was in no sense dissolute or profligate: he was, on the contrary, of reserved and thoughtful habits, and possessed, I firmly believe, of a mind that held him above the influence of any vicious gratification. It might perhaps be said of him, equally with any other young man, that he did not use to the utmost his opportunities; but so far from his having by a vicious course of life impaired his energies, and, himself, caused his premature death,—while instances might be adduced of his devotion to study having endangered his health,—I without hesitation challenge a support of the former implication." . . . "Among his fellow-students, and all who knew Mr. Powell, his name will never be mentioned but with respect." From observance of the manner in which the *Art-Journal* has been conducted, now, for many years, and of the unwillingness of its editor to give pain, we feel assured that no person will regret more than himself the admission into his pages of aspersions which may be found to be unjust, or more readily seek to remove them. We honestly believe the editor of that journal to be incapable of a wilful injustice either to the living or the dead.

Gas.—The Fareham Gas Company are erecting new gas works at a lower level, and removing from their old works, which stand near the top of a hill. ——At an influential meeting of the subscribers of the New Gas Company at Willenhall, on 4th inst. it was unanimously resolved "That if the Willenhall Old Gas Company reduce the price of gas to 5s. to all the consumers under 10,000 cubic feet, and 4s. 6d. to all consumers of more than that quantity, and insert a clause to that effect in their Bill, the public will withdraw all opposition; the reduction to commence at Lady-day next;" and further, "that in case the above proposition be not satisfactorily arranged within a month from this date, we are prepared to organise the strongest opposition in our power to the company obtaining their Act of Parliament." The Old Company had previously offered to reduce the price of gas to 5s. 4s. 9d. and 4s. 6d. as soon as a revenue of 1,500*l.* should be obtained. The purpose of their proposed application to Parliament is to obtain power to open the streets. The New Company have hitherto failed to carry out their scheme, only about 500*l.* instead of 750*l.* required having been paid up.

Great Fire at South Metropolitan District Schools, Sutton.—Nine hundred children (two hundred of them under seven years of age) were suddenly aroused from sleep in the dead of the night, between Wednesday and Thursday last, by the officers in attendance at this great establishment, on a serious alarm of fire, which was raging in the dormitories, and in a brief interval brought down the whole roof of a considerable portion of the building, and the floors beneath, besides one of the water-towers, the workshops, and other departments of the premises. The terror and confusion of such a scene may be imagined, but is beyond description. The appalling danger can only be realized when one keeps in view the deathlike depth of repose in childhood, and the difficulty of restoring the little creatures to the possession of their senses, and to even a glimmering self-consciousness of danger. With the utmost exertions of all in office, it took twenty-five minutes to turn them out, naked, on the lawn, in the midst of severe cold and drifting sleet, from the effects of which, doubtless, many of them will seriously suffer, although soon afterwards huddled into cottages, stables, and station-houses. Why should not the consideration of such possibilities as these have led beforehand to the adoption of as complete a fire-proof construction as could be had in the erection of especially such buildings? As it is, we fear that the narrow and extraordinary escape of so many hundreds of helpless children will but form an additional excuse for leaving such matters to chance and the chapter of accidents, as heretofore. Had not a single nursemaid happened to awake, and to be alarmed by a strong light streaming through a keyhole, all these hundreds of human beings might have continued to sleep till too late, as so many in such circumstances have done.

The Accident at the Manchester Exhibition Building.—We are told that the operative bricklayers of Manchester, not being satisfied with the exculpatory verdict given at the inquest held on the first victim of the accident, and jealous of the honour of their trade, resolved to appoint a committee of their body to report upon the cause of the accident. The deputation inspected the ruins a day or two after the arch fell, and their report agreed in the main with the evidence of Mr. Crowther, architect, as to the imperfect mixing of the mortar, and the general want of care in the construction of such a mass of brickwork. They also inspected the brickwork then going on, and found equal fault with it; and expressed a confident belief that had a competent person belonging to the trade examined the work, he would immediately have put a stop to it. The deputation take exception to a remark made by the town-clerk of Manchester at the first inquest, that such accidents were unavoidable in connection with large works of that kind.

The Iron Trade.—In Yorkshire, Derbyshire, and Lancashire, the prospects of this trade are no better than when the state of the trade was last noticed; and in Staffordshire there is still a downward tendency, with talk of reducing wages. The season for many foreign orders has closed.

Preservation of Inscriptions.—Allow me to inquire if there be any mode of preserving the character of an inscription on *marble*, where exposed to the inclemencies of the atmosphere. About two years since certain tablets were affixed at the cardinal points to the plinth of a column, the engraved letters on which were coloured with a dark paint: these are now almost entirely effaced. Gilding, when applied to iron, retains its freshness: would it be equally retentive of its condition if applied to marble? or, is there any chemical preparation which would defend the restored characters in all their newness of strength and brightness?

A Subscriber.

Water-Works in South Australia.—The Local Government propose spending upon the Adelaide water supply the sum of 164,000*l.* The Water-works Commission, according to the *Australian and New Zealand Gazette*, include in their scheme an immense reservoir of eighteen acres in extent, to hold 60,000,000 gallons, to be constructed at an expense of from 13,000*l.* to 14,000*l.* They do not adopt the recommendation of the Legislative Council Committee to store 86,500,000 gallons, on the ground that "there will be a constant supply running into the reservoir from the Torrens." The *Register* thence argues that the only provision for storage required would be two small settling reservoirs for one day's consumption each, and a clear water one of same capacity, into which the water would flow from the filtering bed, and that thus a saving of 10,000*l.* or 12,000*l.* would be effected.

Stained Glass in Scott Monument, Edinburgh.—The stained windows prepared by Mr. Ballantine from the designs of Mr. David Roberts, R.A. are now in their place, in the chamber entering from the first gallery of the Scott Monument in Princes-street-gardens. This apartment occupies the centre of the structure, immediately over the statue of Sir Walter, and was originally designed for a museum or repository of memorials of Scott. There are four principal windows, and the chief architectural ornamentation of the glass consists of Gothic canopies, with mosaic backgrounds, surmounting figures and armorial bearings supported on pedestal pillars, with foliated caps and panelled backgrounds of geometric tracery. The south window has an effigy of St. Giles, the tutelar saint of Edinburgh, habited in abbot's robes of eighth century. The north has an effigy of St. Andrew, the tutelar saint of Scotland. The west contains the arms of Edinburgh. The east has the ancient arms of Scotland. In each window an angel rising over a carved corbel holds a shield, on which the arms of Scott are blazoned, and the four windows are surrounded with labelled borderings, on which are inscribed lines from the "Lay of the Last Minstrel." After the full-sized drawings were made from Mr. Roberts's sketch designs, they were submitted to that artist, who revised the architectural and heraldic details. Mr. James Drummond also, we understand, furnished sketches for the figures of St. Andrew and St. Giles. There are four smaller windows filled in with glass of simple diapering. "The whole of the work," says the *Scotsman* in describing it, "has been executed with artistic skill, combining minute manipulation with breadth of effect. The colours are well secured and harmoniously arranged. Depth of tone and that flickering brilliancy so much desiderated in painted glass have been attained." The chamber will finally, it is expected, be furnished with memorials of Scott. "If the walls and groinings," adds the paper just named, "were decorated with scrolls, badges, and heraldic devices, carrying out the colouring of the windows in the Mediæval style of embellishment, and care taken that any furnishings were of similar character, the effect would be at once unique and beautiful." Externally, the filling up of the many empty niches with appropriate statues, as originally designed, has also yet to be seen to.

What Sets Houses on Fire?—Your annotation in last week's *Builder*, upon the statement made by me in reference to the liberation of hydrogen from water, dwells upon a point on which, in my necessarily brief communication to the *Morning Advertiser*, I had not the opportunity of expatiating at length; but as it affects an opinion grounded upon an almost microscopical observation of the effects of the decomposition of water in the most minute proportions, I hope you will favour me by allowing me to say that I have reserved the full elucidation of this most important subject, according to my own experiments, for a pamphlet, which is now in the press. Of course, I cannot help entertaining a theory which I believe to be sound; and as it belongs to a class of subjects but little investigated, it is not surprising that my merely aphoristic remarks thereon should *appear* singular. When, however, I publish the facts which led to my conclusions, I have no doubt but that the influence even of infinitesimal decomposition will be accepted, if not as a ground of alarm, at least as a reason for precaution.—F. B. Thompson.

The Cedars, Putney.—A large block of building, situated at the east end of this estate, is now being finished; and we are informed that the gardens and terraces are intended to be completed this year. There appear to be several hundreds of workmen employed by Mr. Rudkin, who is the contractor for the first portion. Mr. Eppy is the architect. It is estimated that the cost, when completed, will be little short of 25,000*l.*

High Price of Land.—At a public auction last week of a small portion of land in the Harrow-road, the executive committee of the Conservative Land Society unsuccessfully offered the large sum of 5,000*l.* for less than two acres.

Bedfordshire Architectural and Archæological Society.—The annual public meeting of this society was held on Thursday in last week, Mr. Talbot Barnard, high sheriff, in the chair. Various objects of interest were exhibited, and the meeting was addressed by the chairman. The report regretted that circumstances had caused a temporary suspension of the public meetings of the society, and concluded by urging its claims on the county for an increased degree of support. A paper was read "On Festival Orientation," by the Rev. William Airy. Mr. Wyatt read one "On the Poets Laureate who have lived in Bedfordshire." Mr. Monkhouse read another "On Cold Harbours."

Parliamentary Bills for New Works.—Amongst the advertisements of intention to proceed with Bills for new works in the ensuing session of Parliament, are the following:—Victoria (London) Docks.—Extension of time for completion of eastern cut and works; powers to make another cut and entrance thereto; further leases of the new works and present undertaking; power to sell the Steel-yard Estate, and make warehouses elsewhere; and for other purposes:—Swansea Harbour Trust and Swansea Dock Company.—Power to the Swansea Harbour Trustees to purchase and complete the undertaking of the Swansea Dock Company; power to the said trustees to make railways to the docks and harbour at Swansea; power to divert a street called the Strand; power to make dams across certain brooks or streams, and to divert waters of same; and for other purposes:—Victoria Gas Company.—Incorporation of company, with powers to construct gas-works, and to supply gas, &c. within certain parishes in the counties of Essex and Kent; powers to purchase, &c. lands for those purposes; to purchase and maintain, &c. existing works; and for other purposes:—Birkenhead Docks.—Alteration of Works; Construction of new works; and for other purposes.

The City of the Hundred (Toll) Gates.—The metropolis of England is the modern Thebes, so far as regards its "hundred gates." It is estimated by the *Globe* that there are literally about one hundred toll-bars by which the metropolis is hemmed in all round, at every point of the compass. "One hundred turnpike-gates," says the *Examiner*, in commentation, "are, in other words, 100 bars to our progress towards all points of the compass—100 interruptions of trade and traffic—100 lets and hindrances to commercial and social intercourse—100 quotidian stoppages on the highway and demands of our purses. The Englishman, and especially the Londoner, must assuredly have 100-horse power of endurance to submit as he does to this century of little persecutions. Multiply the vexation of any one stoppage at any one toll-bar by 100—multiply the product again by the number of people daily stopped and harassed, then multiply the result by the number of days in a calendar year, and you will have a grand annual total of hurry and worry, vexation and molestation, petty taxation and petty tyranny, which, if it could be represented to the eye by any figure or diagram, would be something enormous. The fortifications of Paris are for defence. The circumvallations of London are offence, simply." This intolerable offence we have ourselves not seldom commented on; but even this does not constitute the sum total of such *bars* to *progress*. There are many more closures of thoroughfares besides even the 100 turnpike-gates, to which a quiet and legal, but determined Rebeccaism ought to be opposed. Would that the Welsh blood of our active Home Secretary might only rise to Rebecca heat against the whole system: a sharp and short *Act* from him might very soon make a clean sweep of them.

The Metropolitan Board of Works.—The deputation agreed upon attended Sir B. Hall on Thursday, but too late for us to do more than mention it.

State of Worship-street Police-court.—Reiterated complaints have been made to the magistrates respecting the faulty construction and defective arrangements of this court. Amongst the grounds of complaint are the unwholesome state of the atmosphere, arising from imperfect ventilation and other causes, restricted and insufficient accommodation, the badly-arranged position of the dock and witness-box, and the confined condition of the passages and exterior approaches. In reply to remonstrances, it was intimated last week by Mr. Hammill that the subject in question had occupied his attention from the first day he had presided at the court. He had reason to be painfully sensible of the justice of the complaint. The impurity of the atmosphere was sufficiently explained by the fact that a capacious cesspool was situated in the very centre of the narrow courtyard, within a few paces of the side window of the court, and had not been cleansed out, or at all disturbed for nearly twenty years. The press appeared to be the magistrate's only hope of a remedy.